DEPARTMENT OF PHYSICS

MICHIGAN TECHNOLOGICAL UNIVERSITY (MTU)

CHEMICAL HYGIENE PLAN

Michigan Occupational Health Rule R325.70112
Reference 29 CFR 1910.1450

Occupational Exposure to
Hazardous Chemicals in Laboratories

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RAVINDRA PANDEY
DEPARTMENT HEAD

To be Assigned
CHEMICAL HYGIENE OFFICER

_____
Laboratory Manager

FOREWARD

On 31 January 1990, the Occupational Safety and Health Administration (OSHA) promulgated a final rule for occupational exposure to hazardous chemicals in laboratories. Michigan's version of this rule became effective on January 24, 1992. Included in the standard, is a requirement for all employers covered by the standard to develop and carry out the provisions of a Chemical Hygiene Plan (CHP).

A CHP is defined as a written program which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the physical health hazards presented by hazardous chemicals used in that particular workplace. Components of the CHP must include standard operating procedures for safety and health, criteria for the implementation of control measures, measures to ensure proper operation of engineering controls, provisions for training and information dissemination, permitting requirements, provisions for medical consultation, designation of responsible personnel, and precautions for particularly hazardous substances.

This plan is the Chemical Hygiene Plan developed by and for the Physics Department of Michigan Technological University (MTU) in Houghton, Michigan. This CHP and any lab specific S.O.P. is maintained and readily available to Physics Dept. laboratory employees at MTU. All laboratory personnel must know and follow the procedures outlined in this plan. All operations performed in the laboratory must be planned and executed in accordance with the enclosed procedures. In addition, each employee is expected to develop safe personal chemical hygiene habits aimed at the reduction of chemical exposure to themselves and co-workers. All lab managers and lab personnel must sign an affidavit that they have read, understand, and agree to abide by the contents of this Chemical Hygiene Plan.

This document was developed to comply with rule R325.70106 of the Michigan "Hazardous Work in Laboratories" Standard, R325.70101 et seq. This CHP will be reviewed, evaluated and updated at least annually and is readily available to employees, their representatives and any representatives of the Assistant Secretary of Labor for OSHA.

Failure to observe the following laboratory safety precautions and operating procedures by any employee can lead to the removal of laboratory privileges. If an individual persistently engages in unsafe laboratory practices, dismissal from the University may result.
Please note that for safety purposes, visitors are not permitted in research and instructional labs unless permission has been granted by the Department Chair; this includes spouses and children.

Ravindra Pandey
Department Head

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1. Standard Operating Procedures for Laboratory Chemicals

Standard Operating Procedures (SOP's) are required by law for any lab work that falls outside of the Chemical Hygiene Plan's general operating procedures. A SOP is a set of written procedures explaining how to safely work with specific hazardous chemicals (safety procedures, exposure protection, spill procedures, etc.). They are needed to make the Chemical Hygiene Plan complete. The Physics Dept. of M.T.U. has developed a general chemical hygiene plan, which applies to this department only. When each research lab manager creates SOP's, the Chemical Hygiene Plan becomes specific to their lab & should be kept together. SOPs are not needed when the hygiene plan covers the scope of work performed in the laboratory. If this is the case, write a statement, which says that the hygiene plan covers your activities and insert it into the C.H.P. In either case, a complete list of chemicals found in each lab must be maintained, updated annually, and kept with the lab specific C.H.P.

1.A Chemical Procurement

1.A.1 The decision to procure a chemical shall be a commitment to handle and use the chemical properly from initial receipt to ultimate disposal.

1.A.2 Requests for procurement of new chemicals shall be submitted to Chem Stores or MTU Purchasing Department. Information on proper handling, storage and disposal shall be known to all involved personnel prior to the procurement of the chemical. Chemicals utilized in the laboratory shall be those which are appropriate for the ventilation system.

1.A.3 All chemicals shall be received in a central location. Personnel who receive chemical shipments shall be trained under D.O.T. HM181 AND 126 and be knowledgeable of the hazards associated with the chemical received. Chemical containers shall not be accepted without accompanying labels, material safety data sheets and packaging in accordance with all appropriate regulations. All chemical shipments should be dated when received and opened.

1.A.4 Material Safety Data Sheets must be submitted to Jesse Nordeng.

1.B Chemical Storage

1.B.1 Received chemicals shall be immediately moved to the designated storage area. Glass containers of liquids over 1 liter shall be placed in carrying containers or shipping containers during transportation.

1.B.2 The storage area shall be well illuminated, with all storage maintained below eye level. Large bottles shall be stored no more than two feet from ground level.

1.B.3 Chemicals shall be segregated by hazard classification and compatibility.

1.B.4 Mineral acids should be separated from flammable and combustible materials. Separation is defined by NFPA 45 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials (i.e., separate shelves or cabinets).

1.B.5 Acid-resistant trays shall be placed under bottles of mineral acids.

1.B.6 Acid-sensitive materials such as cyanides and sulfides shall be separated from acids or protected from contact with acids.

1.B.7 Highly toxic chemicals or other chemicals whose containers have been opened shall be stored in unbreakable secondary containers.

1.B.8 Storage of chemicals in laboratories, at the lab bench or other work areas shall be limited to those amounts necessary for ongoing research or teaching activities. The container size shall be the minimum convenient. The amounts of chemicals at the lab bench shall be as small as practical. Chemicals in the workplace shall not be exposed to sunlight or heat.

1.B.9 Stored chemicals shall be examined at least annually by the person in charge of the laboratory for replacement, deterioration, and container integrity. The inspection should determine whether any corrosion, deterioration, or

damage has occurred to the storage facility as a result of leaking chemicals.

1.C Chemical Handling

Each laboratory employee with the training, education and resources provided by supervisors, shall develop and implement work habits consistent with the CHP to minimize personal and co-worker exposure to the chemicals in the laboratory. Based on the realization that all chemicals inherently present hazards in certain conditions, exposure to all chemicals shall be minimized.

General precautions which shall be followed for the handling and use of all chemicals are:

1.C.1 Skin contact with all chemicals shall be avoided.

1.C.2 All employees shall wash all areas of exposed skin prior to leaving the laboratory.

1.C.3 Mouth suction for pipeting or starting a siphon is prohibited.

1.C.4 Eating, drinking, smoking, gum chewing, or application of cosmetics in areas where laboratory chemicals are present shall be avoided. Hands shall be thoroughly washed prior to performing these activities.

1.C.5 Storage, handling and consumption of food or beverages shall not occur in storage areas, chemical laboratories, refrigerators, glassware or utensils also used for laboratory operations.

1.C.6 Risk determinations shall be conservative in nature.

1.C.7 Any chemical mixture of unknown toxicity shall be assumed to be as toxic as its most toxic component.

1.C.8 Substances of unknown toxicity shall be assumed to be toxic.

1.C.9 Laboratory employees shall be familiar with the symptoms of exposure for the chemicals with which they work and the precautions necessary to prevent exposure.

1.C.10 The intent and procedures of this Chemical Hygiene Plan shall be continuously adhered to.

1.C.11 In all cases of chemical exposure, the Permissible Exposure Limits (PELs) of MIOSHA shall not be exceeded. It is recommended that the Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH) should not be exceeded as well.

1.C.12 The engineering controls and safety equipment in the laboratory shall be utilized and inspected in accordance with Appendix "C" of this Plan.

1.C.13 Specific precautions based on the toxicological characteristics of individual chemicals shall be implemented, as deemed necessary by O.S.H.S. These special precautions are listed in Section 8.0.

1.D Laboratory Equipment and Glassware

Each employee shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled in accordance with Section 1.7. At the completion of each workday or (if sooner) operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stored.

In addition, the following procedures shall apply to the use of laboratory equipment:

1.D.1 All laboratory equipment shall be used only for its intended purpose.

1.D.2 All glassware will be handled and stored with care to minimize breakage; all broken glassware will be immediately disposed of in the broken glass container.

1.D.3 All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.

1.D.4 Labels shall be attached to all chemical containers, identifying the contents and related hazards.

1.D.5 Waste receptacles shall be identified as such. Hazardous waste shall be labeled as required under RCRA rules for satellite collection.

1.D.6 All laboratory equipment shall be inspected on a periodic basis as specified in LDU Appendix D, and replaced or repaired as necessary.

1.E Personal Protective Equipment

1.E.1 Eye protective devices meeting ANSI Z87.1 and appropriate for the hazard are required for employees and visitors to the laboratory and will be worn at all times when in the laboratory. Contact lenses are permitted in the laboratory, if approved by the lab supervisor and if appropriate protective devises are worn over the contact lenses.

1.E.2 Chemical goggles and if necessary a full faceshield shall be worn during chemical transfer and handling operations as procedures dictate.

1.E.3 Sandals, perforated shoes, sneakers and bare feet are prohibited. Safety shoes, per ANSI 47 are required where employees routinely lift heavy objects. [NOTE: if no PPE is listed in the SOP for feet, this is not an issue.]

1.E.4 Lab coats or aprons are recommended for wear in the laboratory. They shall be removed immediately upon discovery of significant contamination.

1.E.5 Appropriate chemical-resistance gloves determined based on the criteria in CHP Appendix E shall be worn at all times when there may be skin contact with chemicals. Used gloves shall be inspected and washed prior to re-use. Damaged or deteriorated gloves will be immediately replaced. Gloves shall be washed prior to removal from the hands. Disposable gloves shall not be reused.

1.E.6 Thermal-resistant gloves shall be worn for operations involving the handling of heated materials and exothermic reaction vessels. Thermal-resistant gloves

shall be non-asbestos and shall be replaced when damaged or deteriorated.

1.E.7 Respirator usage shall comply with the MIOSHA Respiratory Protection Rule 3302, and the MTU Respiratory Program. All respirator use, including disposable dust masks, shall receive the approval of the director of O.S.H.S.

1.F Personal Work Practices

1.F.1 Laboratory supervision must ensure that each employee knows and follows the rules and procedures established in this plan.

1.F.2 All employees shall remain vigilant to unsafe practices and conditions in the laboratory and shall immediately report such practices and/or conditions to the laboratory supervisor. The supervisor must correct unsafe practices and/or conditions promptly.

1.F.3 Long hair and loose-fitting clothing shall be confined close to the body to avoid being caught in moving machine/equipment parts.

1.F.4 Use only those chemicals appropriate for the ventilation system.

1.F.5 Avoid unnecessary exposure to chemicals by any route.

1.F.6 Do not smell or taste any chemicals.

1.F.7 Encourage safe work practices in co-workers by setting the proper example. Horseplay is strictly forbidden.

1.F.8 Seek information and advice from knowledgeable persons, standards and codes about the hazards present in the laboratory. Plan operations, equipment and protective measures accordingly.

1.F.9 Use engineering controls in accordance with Section 3.0.

1.F.10 Inspect personal protective equipment prior to use, and wear appropriate protective equipment as procedures dictate and when necessary to avoid exposure.

1.G Labeling

1.G.1 All containers in the laboratory must be labeled. This includes chemical containers, waste containers, and non-hazardous substance containers. The label shall be informative and durable, and at a minimum, will identify contents, and indication of hazard.

1.G.2 Portable containers shall be labeled by the individual using the container.

1.G.3 Exemptions for labeling requirements shall be made for chemical transfers from a labeled container into a container which is intended only for the immediate use of the employee who performed the transfer (i.e., the contents completely used the same day of transfer) (See LDU Appendix C).

2. Criteria for Implementation of Control Measures

2.A Air Sampling

2.A.1 Air sampling for evaluating employee exposure to chemical substances shall be conducted in consultation with O.S.H.S. as specified by specific codes or regulations or whenever a PEL may be exceeded, or whenever exposure symptoms are experienced.

2.A.2 The results of any air sampling studies performed in the laboratory must be maintained and recorded.

2.B Housekeeping

2.B.1 Each laboratory worker is directly responsible for the cleanliness of his or her workspace, and jointly responsible for common areas of the laboratory. Laboratory management shall insist on the maintenance of housekeeping standards.

2.B.2 The following procedures apply to the housekeeping standards of the laboratory:

2.B.2.1 All spills on lab benches or floors shall be immediately cleaned and properly disposed of.

Large spills will necessitate the implementation of the Emergency Action Plan per Michigan Occupational Health Rule R325.52101 and outlined in the M.T.U. Safety Manual.

2.B.2.2 The lab benches shall be kept clear of equipment and chemicals, except those necessary for the work currently being performed.

2.B.2.3 The work area shall be cleaned at the end of each operation.

2.B.2.4 All apparatus shall be thoroughly cleaned and returned to storage upon completion of usage.

2.B.2.5 All floors, aisles, exits, fire extinguishing equipment, eyewashes, showers, electrical disconnects and other emergency equipment shall remain unobstructed.

2.B.2.6 All labels shall face front.

2.B.2.7 Chemical containers shall be clean, properly labeled and returned to storage upon completion of usage.

2.B.2.8 All chemical wastes will be disposed of in accordance with the MTU Waste Disposal Plan (See LDU Appendix C).

2.C Safety and Emergency Equipment

2.C.1 Telephone numbers of emergency personnel, supervisors and other workers as deemed appropriate have been posted. These phone numbers are listed in at the start of this binder.

2.C.2 All employees who might be exposed to chemical splashes shall be instructed in the location and proper usage of emergency showers and/or eyewashes. The eyewash shall be activated weekly and tested annually.

These annual tests shall be performed by the building attendant and in accordance with ANSI Z358.1 and manufacturer's specifications. Records of inspections shall be maintained by the Occupational Safety and Health Services Office.

2.C.3 Location signs for safety and emergency equipment have been posted.

3. Engineering Controls

3.A Intent

The engineering controls installed in the laboratory are intended to minimize employee exposure to chemical and physical hazards in the workplace. These controls must be maintained in proper working order for this goal to be realized.

3.B Modification

No modification of engineering controls will occur unless testing indicates that worker protection will continue to be adequate.

3.C Improper Function

Improper function of engineering controls must be reported to O.S.H.S. immediately. The system shall be taken out of service until proper repairs have been executed.

3.D Usage

All employees shall follow proper work practices when using the engineering controls.

3.D.1 Local Exhaust Ventilation

The following procedures shall apply to the use of local exhaust ventilation:

3.D.1.1 Openings of ducts shall be placed as close as possible to sources of the air contaminant.

3.D.1.2 Clear the screen, if present, on the face of the hood prior to usage.

3.D.1.3 Exhaust fans shall operate when local ventilation is being used.

3.D.1.4 After using local ventilation, operate the fan for an additional period of time sufficient to clear residual contaminants from the ductwork.

3.D.1.5 Adequacy of local ventilation shall be made in consultation with OSHS if there is reason to believe a PEL may be exceeded.

3.D.1.6 Local ventilation shall not be used for highly toxic or hazardous substances.

3.D.2. Laboratory Hoods

The laboratory hoods shall be utilized for all chemical procedures which might result in release of hazardous chemical vapors or dust. As a general rule, the hood shall be used for all chemical procedures and is mandatory for substances which are appreciably volatile and have a permissible exposure limit (PEL) less than 50 PPM.

The following work practices shall apply to the use of hoods: (See CHP Appendix C).

3.D.2.1 Confirm adequate hood ventilation performance prior to opening chemical containers inside the hood. An inward flow of air can be confirmed by holding a piece of paper at the face of the hood and observing the movement of the paper.

3.D.2.2 Keep the sash of the hood closed at all times except when adjustments within the hood are being made. At these times, maintain the sash height as low as possible.

3.D.2.3 Storage of chemicals and equipment inside the hood shall be kept to an absolute minimum.

3.D.2.4 Minimize interference with the inward flow of air into the hood.

3.D.2.5 Leave the hood operating when it is not in active use if hazardous chemicals are contained inside the hood or if it is uncertain whether adequate general laboratory ventilation will be maintained when the hood is non-operational.

3.D.2.6 The fume hood shall be evaluated annually by O.S.H.S. The hood face velocity shall be maintained between 75 and 125 feet per minute. A record of each inspection shall be maintained by the Manager of O.S.H.S.

3.D.2.7 The hood shall not be used as a means of disposal for volatile chemicals.

3.D.3 Storage Cabinets

Storage cabinets for hazardous chemicals will be ventilated as needed. Flammable storage cabinets shall not be ventilated unless approved by O.S.H.S.

4. Employee Information and Training

4.A Hazard Information

All employees will be apprised of the hazards presented by the chemicals in use in the laboratory. Each employee shall receive training at the time of initial assignment to the laboratory, prior to assignments involving new exposure situations, and at a regular frequency as determined by the laboratory supervisor.

4.B Forms

The forms in CHP Appendix D entitled "New Employee Chemical Hygiene Orientation and Training Checklist" and "New Chemical

Training Checklist" shall be used for these purposes. These forms must be signed and kept on file.

4.C Training

Employee training shall include all of the following:

(a) Methods and observations that may be used to detect the presence or release of a hazardous chemical, such as monitoring conducted by the employer, continous monitoring devices, and the visual appearance or odor of hazardous chemicals and when being released.

(b) The physical and health hazards of chemicals in the work environment.

(c) The measures employees can take to protect themselves from health hazards, including specific procedures that the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

(d) The employee shall be trained about the applicable details of the employer's written chemical hygiene plan.

The training shall present the details of the Chemical Hygiene Plan, and shall include:

4.C.1 the contents of the Michigan Occupational Health Rule R325.7010 et seq., and its appendices;

4.C.2 the location and availability of the Chemical Hygiene Plan;

4.C.3. the permissible exposure limits for OSHA regulated substances or recommended exposure values for other hazardous chemicals not regulated by OSHA which are present in the laboratory;

4.C.4 signs and symptoms associated with exposure to the chemicals present in the laboratory; and

4.C.5 location and availability of reference materials on chemical hygiene.

5. Prior Approval of Laboratory Activities

5.A Off-Hours Work Procedures

Laboratory personnel are not permitted to work after hours (between 6PM and 8AM) in the lab, except with the express permission of the laboratory supervisor.

5.B Sole Occupancy

At no time shall work involving chemicals, mechanical equipment, or electrical devices be performed in the laboratory when the only person in the building and knowledgeable in the work hazards is the laboratory person performing the work. At least a second person who is knowledgeable of the work must be within close personal verbal contact with the worker. Under unusual conditions, cross-checks, periodic security guard checks, closed circuit television, or other measures may be taken when permitted.

5.C Hazardous Work

All hazardous operations are to be performed during a time when at least two personnel are present in the laboratory. At no time shall a laboratory person, while working alone in the laboratory, perform work which is considered hazardous. The determination of hazardous operations shall be made by the laboratory supervisor and permitted.

5.D Unattended Operations

When laboratory operations are performed which will be unattended by laboratory personnel (continuous operations, overnight reactions, etc.), the following procedures will be employed:

5.D.1 The laboratory supervisor will review work procedures to ensure for the safe completion of the operation.

5.D.2 An appropriate sign will be posted at all entrances to the laboratory.

5.D.3 The overhead lights in the laboratory will be left on, with the exception of "Laser Labs" with experiments requiring no light. In this case, a light outside the lab must indicate "Laser in Use."

5.D.4 Precautions shall be made for the interruption of utility service during the unattended operation (loss of water pressure, electricity, etc.).

5.D.5 The person responsible for the operation will return to the laboratory at the conclusion of the operation to assist in the dismantling of the apparatus.

6. Medical Consultations and Examinations

6.A An opportunity to receive medical attention is available to all employees who work with hazardous chemicals in the laboratory. The opportunity for medical attention will be made available to employees under the following circumstances:

6.A.1 Whenever an employee develops signs or symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory;

6.A.2 Medical surveillance programs will be established where exposure monitoring reveals an exposure level above the action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, and/or;

6.A.3 Whenever an event takes place in the laboratory such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure the employee will be provided an opportunity for medical consultation for the purpose of determining the need for medical examination.

6.B. These medical consultations and examinations shall be provided without cost to the employees, without loss of pay and at a reasonable time and place.

6.C These medical consultations and examinations shall be administered by or under the direct supervision of a licensed physician. Employees seeking the opportunity of medical consultation should notify the Occupational Safety Health Services Office or Benefits Services in the Human Resources Office.

7. Chemical Hygiene Responsibilities

7.A Chief Executive Officer

The Department Chair has the ultimate responsibility for chemical hygiene throughout the laboratory and with assistance of other program administrators, principal investigators, students, and the CHO will provide continued support for chemical hygiene.

7.B Laboratory Workers

The laboratory workers are individually responsible for:

7.B.1 planning and conducting each laboratory operation in accordance with the Chemical Hygiene Plan,

7.B.2 developing good personal chemical hygiene habits.

8. Special Precautions for Particularly Hazardous Substances

When laboratory procedures change to require the use of additional classifications of chemicals (allergens, embryotoxins, teratogens, carcinogens, etc.), additional special precautions shall be implemented as deemed necessary by O.S.H.S.

9. Record Keeping

9.A All Accident investigations will be conducted by the immediate supervisor, with assistance from other personnel as deemed necessary.

9.B Accident reports will be completed by the supervisor and submitted to O.S.H.S. within 24 hours.

9.C Exposure records for hazardous chemicals and harmful physical agents will be maintained by O.S.H.S. for 30 years per Michigan Occupational Health Rule R325.3451 et seq.

9.D Medical records for employees exposed to hazardous chemicals and harmful physical agents will be maintained by Portage Health Systems on behalf of M.T.U. for the duration of employment plus 30 years per Michigan Occupational Health Rule R325.3451 et seq.

9.E Inventory and usage records for high risk substances (amounts of substances on-hand, amounts used and names of workers

involved) shall be maintained by the Physics Department for seven years.

9.F Records of inspections of equipment will be maintained by the laboratory supervisor for seven years.

9.G Records of employee training will be maintained by the Physics Department for seven years.

10. Chemical Spills, Releases and Accidents

In the event of a chemical spill, release or other accident, Michigan Technological University will adhere to the procedures outlined in the Emergency Response Plan as required by the Michigan Occupational Health Rule R325.52101 and found in the M.T.U. Safety Manual.

Chemical spills may be cleaned up by "on-site" personnel, provided they are qualified to do so and the response is not considered an emergency response. Custodians at MTU have not been trained to respond to chemical spills and may not do so.

If any one of the following conditions is true, MIOSHA considers a spill response to be an emergency response, requiring personnel with certified spill response training:

(1) No employees are adequately prepared or sufficiently knowledgeable of the hazards present to safely clean up the spill and a call is made for outside help.

(2) The spill requires evacuation of people from the area.

(3) The spill creates a condition that is immediately dangerous to life or health (IDLH).

(4) The spill enters any surface or ground water.

(5) Spills entering any building drain must be reported to OSHS immediately.

Faculty and staff at MTU are expected to be prepared to respond appropriately to spills of the materials they use or have on hand. They should have the necessary response supplies for non-emergency spills (Chemical Sciences Building Spill Response Team supplies are not provided for this purpose). Use of substances in quantities that could result in an IDLH condition during a spill should be communicated to O.S.H.S. for assistance in

the development of safe handling and emergency response procedures. These procedures must be communicated to all affected personnel and must be followed precisely.

Occupational Safety and Health Services will respond to spills where assigned personnel are not available or where assistance is needed to determine whether an emergency response is required. **Requests for assistance with chemical spills should be made through the office of OSHS (7-2118) or Public Safety at 7-2216, or 911 for emergencies.**

11. Hazardous Waste

11.A The following items and materials must **not** be placed in the dumpster: fluorescent light bulbs, computers, video monitors, circuit boards, lead acid and rechargeable batteries, misc. steel and metals, liquids of any kind and chemical bottles with contents in them (regardless of toxicity). Solid lab wastes must have the approval of OSHS before placing it in the dumpster or wastebaskets.

11.B Nothing goes down the drains via sinks or toilets except household type wastes. Any chemicals, lab wastes, etc. that you feel are harmless and compatible with the local Waste Water Treatment Plant must first have approval from OSHS. **There are no exceptions!!!**

11.C Hazardous wastes generated in individual labs must be stored at the point of generation (in the lab) and not in the surplus chemical storage area. Hazardous wastes in the lab **must** be labeled, identified, and dated. Collection of containers with hazardous waste will only be done upon the completion of a "Request for Collection of Hazardous Chemicals" form per the example in LDU Appendix C.

11.D It is your responsibility to educate and train students and employees working with you regarding: safety, chemical acquisitions, chemical storage, hazardous waste, and the Chemical Hygiene Plan. All training must be documented and signed by the trainee with copies forwarded to Jesse Nordeng.

See LDU Appendix C for MTU Hazardous waste disposal procedures and hazardous waste description codes.

12. Annual Chemical Hygiene Plan Review

The Physics Department will review the Chemical Hygiene Plan each year and the Plan will be updated as needed at that time.

13. References and Recommended Reading

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

Freeman, N.T., *Introduction to Safety in the Chemical Laboratory,* Academy Press, 1982.

Pipitone, David A., *Safe Storage of Laboratory Chemicals*, Wiley and Sons, Inc., 1984.

Code of Federal Regulations, 29 CFR part 1910 subpart Z section 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*, 1990.

14. Laboratory Employee Exit Policy

A laboratory employee exit policy which applies to all research faculty, staff, and graduate students exists at MTU. This policy requires that the exiting person properly dispose of all chemicals and equipment that have not been re-assigned to another MTU employee.

14.A Upon the decommissioning of a laboratory, the previous occupant is responsible for the proper disposal of all hazardous chemicals. Any remaining research funds and incentive accounts shall be withheld pending such cleanup.

14.B A signed statement indicating that the exit interview has been performed, that the exit policy has been successfully accomplished, and an inventory of chemicals and equipment re-assigned with the name of the new owner(s) **MUST** be submitted to the department chair prior to graduation or leaving the University.

14.C Signed statements from exiting students and/or employees (see LDU Appendix E) must be completed and kept on file. When

requested, the annual department safety summary and the previous years exit interviews will be sent to OSHS.

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