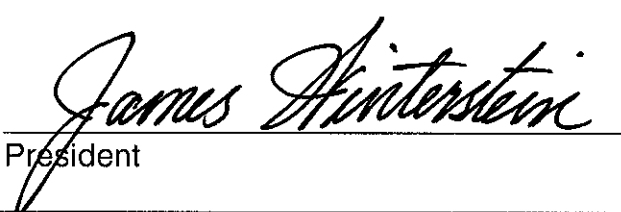




National University of Health Sciences General Policies

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President				

POLICY STATEMENT

It is a policy of The National University of Health Sciences (NUHS) to establish a program ensuring that control methodologies are implemented to prevent unacceptable personal exposure to hazardous chemicals in laboratories.

The objective is to promote the improvement of laboratory health and safety by ensuring that the proper procedures, training, and a written chemical hygiene plan are in compliance with 29 CFR 1910.1450, "Occupational Exposure to Hazardous Chemicals in Laboratories", (also known as the OSHA Laboratory Standard), as well as other applicable regulations the laboratory is required to follow. The effectiveness of the plan will be revised annually and changes made as are necessary to prevent personal exposure to hazardous chemicals in the laboratory.

1.2 GENERAL PRINCIPLES

All chemicals, because of concentration, toxicity, flammability, carcinogenicity, or other characteristics, are potential health hazards. The intent of the Chemical Hygiene Plan is to provide guidelines for handling and using chemicals without causing harm to oneself, other employees, students, patients, visitors or to the laboratory environment.

1.1 Minimize exposure

Even for substances with no known significant hazard, exposure should be minimized. When working with substances that present special hazards, special precautions should be taken. Engineering controls and personal protective equipment should be used to minimize exposure.

1.2 Avoid underestimation of risk

All personnel should assume that a mixture presents all the hazards of its components. One should assume that all substances of unknown toxicity are toxic.

1.3 Provide employee exposure assessment

The University and all personnel shall maintain personal exposure below the OSHA Permissible Exposure Limits (PEL) and other applicable exposure limits by informed exposure potential assessment and workplace exposure monitoring as appropriate.

1.4 Engineering controls

Control methods such as laboratory hoods, local exhaust ventilation, enclosures, wet methods, etc, will be applied in preference to primary dependence on personal protective equipment such as respirators.

2.2 LEVELS OF RESPONSIBILITY

2.1 The President (Chief Executive Officer) of NUHS has the ultimate responsibility for chemical hygiene at the University and will, with other of the staff, provide continuing support for chemical hygiene.

2.2 Each laboratory supervisor has overall responsibility for chemical hygiene in their respective laboratory. The laboratory supervisor must:

2.2.1 Ensure that employees and students know and follow the chemical hygiene rules, make sure protective equipment is available and in working order, and training and information have been provided. This includes assuring that Material Safety Data Sheets (MSDS) are readily available for substances used in the laboratory.

2.2.2 Maintain training records in an auditable form.

2.2.3 Provide regular chemical hygiene and housekeeping inspections.

2.2.4 Know the current legal requirements concerning regulated substances.

2.2.5 Determine the required levels of protective apparel and equipment.

2.2.6 Ensure that facilities are adequate for any new hazard introduced into the laboratory.

2.2.7 Help project directors develop precautions and adequate facilities, as they apply to the OSHA Laboratory Standard.

2.2.8 Maintain compliance to the Chemical Hygiene Plan.

2.3 Chemical Hygiene Officer (CHO) is a technically qualified individual designated by Laboratory management. Responsibilities are outlined in section 3.0.

2.4 Laboratory Worker must plan and conduct each operation in compliance with the established procedures, good personal hygiene practices as well as consultation with and approval of the Laboratory Supervisor. Laboratory personnel are responsible to place warning signs and labels on chemical containers, equipment, or areas where special or unused hazards are in use.

3.2 CHEMICAL HYGIENE OFFICER (CHO)

3.1 NUHS has a designated CHO. The CHO may be contacted at the number found on the NUHS Emergency Information Sheets posted throughout facilities.

3.2 CHO Role/Function

- 3.2.1 Provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Policy and the Hazard Communication Program.
- 3.2.2 Work with administrators and employees to develop and implement appropriate chemical hygiene policies and practices.
- 3.2.3 Monitor the procurement, use, and disposal of chemicals used in the area of responsibility, in conjunction with the lab supervisors.
- 3.2.4 Review and approve operations as stated in the Chemical Hygiene Plan that require the approval process.
- 3.2.5 Provide constant oversight on implementation of the Chemical Hygiene Plan.
- 3.2.6 See that periodic audits of the program are conducted including laboratory inspections (Appendix 3).
- 3.2.7 Help project directors develop precautions and adequate facilities, as they apply to the OSHA Laboratory Standard.
- 3.2.8 Know the current legal requirements concerning regulated substances and maintain appropriate reference sources.
- 3.2.9 Annually review, evaluate and update the Chemical Hygiene Plan for the area of responsibility.
- 3.2.10 Annually review, evaluate and update the Hazard Communication Program.

4.2 EXPOSURE ASSESSMENT AND REDUCTION.

4.1 Hazard Identification

- 4.1.1 Sufficient information about the hazardous and toxic properties of chemicals must be obtained to allow safe handling, which is routinely done by obtaining a Material Safety Data Sheet for each chemical. Chemicals presenting an unusual or severe exposure hazard may require notification or approval by the CHO, as specified in section 4.3.1.
- 4.1.2 Good chemical labeling practices shall be observed and labels on incoming containers shall not be removed or defaced. When materials are transferred from their original containers, the container into which a material is placed shall be properly labeled.

- 4.1.3 A known chemical produced in a laboratory shall be evaluated by reviewing the available literature to determine if it is a hazardous chemical. An unknown chemical composition shall be treated as a hazardous substance.
- 4.1.4 Material Safety Data Sheets (MSDS) must be kept readily available for any chemical substances. If a current MSDS is not available, it shall be requested whenever a chemical product is ordered. A large central file collection of MSDS is maintained. If an MSDS is received which is not in the site inventory MSDS listing, a copy of the MSDS must be sent to the office of Human Resources.
- 4.1.5 If a substance is produced for someone outside the laboratory, the chemical must have a hazard warning label and a MSDS prepared and provided to the user. The CHO must be consulted for review of a MSDS before it is sent outside of the laboratory.
- 4.1.6 The CHO will make hazard information available for highly acutely toxic, "select carcinogens", and reproductive hazards regulated by the OSHA Laboratory Standard. This information will be in the nature of Material Safety Data Sheets (MSDS), vendor supplied product information sheets, or reprints from appropriate reference sources. If this information is not available upon receipt of substance, contact the CHO before handling the chemical. All other hazardous chemical information should already be available on MSDS or product labels.

4.2 Laboratory Facilities

- 4.2.1 Laboratory facilities will be appropriately designed and operated for the safe handling of the chemicals to be used in them.
- 4.2.2 The following features and/or conditions will be reviewed to assure they are appropriate before a chemical is handled:
- Ventilation and exhaust
 - Appropriate storage and stock rooms
 - Hood and sinks
 - Waste handling and disposal, and other safety equipment including eye wash fountains, drains and showers, waste disposal equipment.

4.3 Chemical Procurement and Storage

4.3.1 Procurement:

- Before a substance is received, information on proper handling, storage and disposal must be known to those who will be involved. Any container that does not have an adequate identifying label must not be accepted.
- The CHO will coordinate the maintenance of an inventory of chemicals and chemical products through the site wide inventory program.
- Any personnel directly obtaining samples from a non-commercial source are personally responsible to notify the CHO.

4.3.2 Laboratory Storage

- Chemical storage within laboratories must be kept to reasonable quantities consistent with work in progress. Generally a thirty (30) day supply will be reasonable.
- Chemicals which have a usable life must be dated by the manufacturer, or upon receipt in the laboratory.
- In general, flammable materials of 1 to 5 gallons must be stored in approved safety containers, and 25 to 60 gallons must be stored in UL-listed flammable materials storage cabinets. Flammable materials must not be stored in refrigerators unless the refrigerators are approved as explosion proof.
- Chemical storage in fumehood work areas is not acceptable, except where highly volatile/noxious materials are in containers which may not be vapor tight and where placement in the hood does not interfere with proper hood operation.
- Cooperation with a site wide chemical inventory effort is required. This will be done at least annually; unwanted/outdated chemicals should be searched for and properly disposed of as part of this process.

4.3.3 Security of Storage Areas

- All storage areas for quantities of hazardous materials in excess of the amount needed to conduct routine operations shall be secured with a locking device with documented control to be determined by each lab or department. Quantities requiring secure storage are relative to the degree of hazard for each chemical and its use. Questions regarding quantities and storage conditions should be referred to the Chemical Hygiene Officer.

4.4 Laboratory Safety Operating Procedures

4.4.1 Working with Chemicals - This section provides some general and specific guidance on chemical handling:

- The laboratory worker is responsible to comply with policies and procedures on the use of personal protective equipment, and to remove contaminated equipment before leaving the use area.
- Review and concurrence (prior approval) of the CHO is required for the following procedures:
 - a) Work with highly toxic materials. As a general rule, this applies to those substances with exposure limits below 1ppm or 0.5 mg/cu.m of air.
 - b) Work with Class I carcinogens.
- New projects using hazardous chemicals require pre-operation safety reviews.

4.4.2 Laboratory Workplace Hygiene; Working with Toxic and Hazardous Chemicals. This section contains general guidance to supplement the specific work procedures

- a) Personal hygiene:
 - Avoid unnecessary exposure to chemicals by any route. Do not deliberately smell or taste chemicals.
 - Avoid eating, drinking, and smoking in areas where chemicals are present.
 - Storage of food and beverages in storage areas and refrigerators used for laboratory operations is prohibited.
- b) Avoid the release of toxic substances in cold rooms and warm rooms, since these contain re-circulated atmospheres.
- c) Hazardous chemical use must be restricted to rooms having direct exhaust ventilation. Recirculation of air from chemical laboratories to other rooms is not acceptable.
- d) Ovens used for processing hazardous chemicals must be ventilated properly to control any hazardous emissions.
- e) Seek information and advice about hazards, plan appropriate protective procedures, and plan positioning of equipment before starting any new operation.
- f) When venting containers, or setting up containers with pressure relief joints or valves, take precautions to ensure that the discharge is directed safely or filtered. Be sure to relieve gas pressure from cylinder regulators before disconnecting. It is good practice to stand aside of the gauge faces when opening regulator valves.

- g) Use a fume hood for operations which might result in the release of toxic gases, vapors, or particulates. As a rule of thumb, engineering controls need to be used when handling any volatile substances with a TLV of less than 50ppm, or the LC50 is less than 200ppm, or oral LD50 is less than 50mg/kg.
- h) Assure that the plan for each laboratory operation includes plans and training for waste disposal. Apply waste minimization whenever feasible.
- i) Know the location of eyewash and shower facilities for your laboratory; these are required in each laboratory where hazardous chemicals are used.
- j) Use face shields, impermeable gloves and aprons, as appropriate, to avoid contact with chemicals. Safety glasses or chemical goggles are necessary in addition to face shields. To supplement specific procedure training provided by supervisors, refer also to the National Research Council's "Prudent Practices for Handling Hazardous Chemicals in Laboratories."
- k) When diluting concentrated acid, add acid to the diluent. Use an ice bath, or have a cold water source available, to reduce the reactivity hazards from extremely exothermic acid/base reactions.
- l) The date of receipt and date of opening must be recorded on containers of chemicals that could present long term storage hazard; e.g., peroxide forming ethers.
- m) Special procedures may be required for certain extremely hazardous chemicals; e.g., phenol and OSHA substance specific chemicals, such as benzene and formaldehyde.
- n) Chemical use outside of a laboratory hood requires evaluation of the exposure potential of toxic materials, which may cause air contamination and possible need for respiratory protection or other controls.
- o) Wear appropriate protective apparel and gloves to prevent hand contact with allergens or substances of unknown allergenic activity (examples include diazomethane, isocyanates, bichromates).
- p) Special care shall be taken to minimize chemical exposure during pregnancy. Chemical handling operations during pregnancy require a review of work practice charges to accomplish this. Notification of the CHO is also required.
- q) Pregnant laboratory workers are requested to consult with the NUHS clinic or a personal physician at an early stage.

4.5 Employee Exposure Determination and Evaluation

Current and proposed uses of hazardous chemicals must be assessed as to the potential for workplace exposure. The criteria to be used in determining the adequacy of control include whether airborne exposures may exceed established limits and whether dermal exposure can cause skin injury or absorption of toxic quantities. For materials which may have irreversible toxic effects or be classified as carcinogens, the concept of maintaining exposure as low as reasonably achievable (ALARA) should be followed. Factors to be considered in making the determination of exposure potential include:

- Physical and chemical properties of compound or mixture.
- Quantity used and frequency of use outside of fume hood.
- Open containers vs. covered systems and potential for airborne exposure.
- Exposure controls currently in place.
- Chemical stability of the compound.
- Volatility or vapor pressure.
- Established occupational exposure limits, such as OSHA Permissible Exposure Limit (PEL), ACGIH Threshold Limit Values (TLV) or AIHA Workplace Environmental Exposure Levels (WEEL).
- Toxicological information on the substance. Review of handling precautions and hazards indicated on the manufacturer's material safety data sheet.

4.6 Initial review of exposure potential must be made by the laboratory supervisor. If there is concern about possible extent of exposures or a need for additional information, this should be sought from the CHO.

4.6.1 Where the need is indicated, on-site review and exposure determination measurements can be arranged through the CHO. Results of monitoring will be reported back to the supervisor within 15 working days of receipt of the laboratory results. Supervisors have a duty to report results written to affected employees, either by personal communication or by posting of the results.

4.6.2 When monitoring has demonstrated that permissible exposure limits may be exceeded, or readily achievable improvements can further reduce exposures, such improvements will be implemented. Input on implementing these changes will be provided by the Laboratory Supervisor and CHO.

4.7 Engineering Controls

4.7.1 All laboratory fume hoods are to be tested at least annually by maintenance personnel. Hoods designated for general chemical use (Class C) must maintain a minimum of 100 feet per minute (fpm) face velocity; those for radioactive or higher toxicity materials (Class R) must maintain 125 feet per minute (fpm) face velocity.

- 4.7.2 Any hoods not posted as being tested and meeting above criteria within the past year must be brought to the attention of maintenance by the laboratory supervisor.
- 4.7.3 Hoods failing to meet the above test criteria will be tagged at the time of service, and a written notice will be sent to the laboratory supervisor. Hoods so tagged must be taken out of service until repaired or posted as to restricted service, as approved by the CHO.

4.8 Designated Areas

- 4.8.1 When working with particularly hazardous substances, additional employee protection is necessary. A designated area (generally a fume hood, but could be a specifically designed laboratory) is assigned for use when handling Class I carcinogens. Designated areas are also appropriate for work with certain reproductive toxins and highly toxic substances, especially those with exposure limits below 1 ppm or 0.5 mg/cu.m. of air.
- 4.8.2 Designated work areas must be posted indicating the potential hazard and the requirement to follow the special work procedures established.

4.9 Emergency Plan/Spill Control

- 4.9.1 Spills, accidents, explosions, fires, and similar incidents which have or may result in injury or significant property damage must be reported to the CHO immediately.
- 4.9.2 In the event the CHO is unavailable, or at the discretion of the CHO, the following persons are to be called in order, until one has been contacted: 1) President, 2) Any Vice President, 3) Any Assistant Vice President, 4) Any Dean, 5) Director of Facilities, 6) Director of Human Resources. Once a person designated above is contacted, that person will decide who else is to be called.
- 4.9.3 Spills should not be cleaned up by laboratory personnel, unless proper supplies, training, and personal protective equipment have been previously provided.
- 4.9.4 Any chemical materials used or collected in a spill response incident must be held for proper disposal. Spilled chemicals, contaminated glassware or other containers must be disposed of in trash receptacles.

5.2 TRAINING PROGRAM

- 5.1 All new employees and students shall receive basic orientations in health and safety requirements.
- 5.2 Supervisors have a duty to see that each employee and student is provided the necessary information and training on specific hazards of the materials they use. This must include:
 - a) Methods and observations that may be used to detect presence or release of a hazardous chemical.
 - b) Physical and health hazards of chemicals in the work area, and

- c) Measures to take to protect themselves including work practices, emergency procedures, and personal protective equipment.
- 5.3 In addition, each employee and student must be aware of the location of material safety data sheets covering materials in the workplace.
- 5.4 Employees must also be aware of provisions of the OSHA Laboratory Standard. This will be accomplished by circulating materials in the workplace.
- a) A copy of the OSHA Laboratory Standard, 29 CFR 1910.1450.
 - b) A copy of the Chemical Hygiene Plan for this institution.
- 5.5 Documentation of the instruction and information given to employees must be provided to the CHO, to be held in an auditable file.

6.2 MEDICAL CONSULTATION AND EVALUATION

- 6.1 Any employee who suspects exposure will be referred for appropriate evaluation and/or treatment. They must report to his/her supervisor. The employee will be provided with the opportunity to receive medical attention and follow-up examinations under the following circumstances:
- 6.1.1 Whenever signs or symptoms develop that might be associated with exposure in the workplace.
 - 6.1.2 When exposure monitoring reveal a level above the action level.
 - 6.1.3 Whenever a spill or other event occurs that might result in exposure.
- 6.2 When an unusual occurrence, such as a spill, results in a potentially significant exposure, the CHO must be notified to assure that prompt attention is received.

7.2 RESPIRATOR USE

Engineering controls such as laboratory hoods, enclosed operations, and lower toxicity substitute materials must be the first level of protection. Where engineering controls are not feasible or for temporary operations or where an additional level of protection is desired, respiratory protective equipment may be used. The NUHS policy on Respiratory Protection provides guidance on this subject.

8.2 WASTE DISPOSAL/WASTE MINIMIZATION PROGRAM

- 8.1 Planning for waste disposal and minimization should be implemented before purchasing a hazardous chemical.
- 8.2 Serious problems of air and water pollution, as well as serious hazards to facility personnel, may be created by improper handling of waste produced even by small laboratory operations.
- 8.3 It is the responsibility of any chemical user to be sure that materials generated in the process or recreation can be safely and properly disposed. Each laboratory supervisor has the responsibility to ensure that waste chemicals are safely collected, identified, and stored for disposal, and that the disposal company is fully advised for any special methods or facilities required. Consideration must be made of the quantities ordered, use process, and possible reuse of chemicals in order to assure waste minimization.

9.2 RECORD KEEPING

- 9.1 Records of information and training provided under the plan must be provided to the CHO.
- 9.2 Management must maintain records of medical consultation and examinations for 30 years beyond employee/employer separation.
- 9.3 The CHO must maintain a listing of chemicals and chemical products used in NUHS Laboratories.
- 9.4 The CHO must maintain current records of exposure limits specified by OSHA in 29 CFR 1910, subpart Z.

10.0 APPENDICES AND REFERENCES

- 10.1 Hazardous Chemical Information Sources: The major health exposure chemical lists and reference sources are:
 - OSHA Air Contaminants (29 CFR 1910, subpart Z).
 - OSHA Specifically Regulated Substances (29 CFR 1910.1001-1101).
 - National Toxicology Program, latest Report on Carcinogens
 - International Agency for Research on Cancer, latest volume on human carcinogens (groups 1, 2A, and 2B).
 - Teratogens identified in Thomas H Shepard, Catalog of Teratogenic Agents, latest edition, Johns Hopkins Press.
 - NIOSH Registry of Toxic Effects of Chemical Substances, latest edition.
 - Dangerous Properties of Industrial Materials, N. Irving Sax, latest edition.
- 10.2 Chemical Inventory: Each laboratory will have material safety data sheets available for laboratory supervisors. These must be kept available for reference by employees.
- 10.3 Laboratory Safety Checklist: The Laboratory Safety Checklist should address:
 - The safe performance of miscellaneous laboratory practices.
 - Waste disposal practices
 - Safety equipment
 - General procedures to be followed in the event of emergency
 - Equipment safety.

**OSHA LABORATORY STANDARD TRAINING DOCUMENTATION
RECORD INFORMATION**

I have been provided details of:

1. The contents of the Laboratory Standard and its appendices
2. The location and availability of the Chemical Hygiene Plan for my laboratory.
3. Hazardous chemicals located in my laboratory:
 - The permissible exposure limits for OSHA regulated substances.
 - The recommended exposure limits for other hazardous chemicals; where they are available.
 - Signs and symptoms associated with exposure.
 - Location and availability of reference materials on the hazards, safe handling, storage and disposal, including Material Safety Data Sheets.

TRAINING:

I have been provided additional training that explained:

1. The physical and health hazards of chemicals in my work area.
2. The methods and observations that may be used to detect the presence or release of a hazardous chemical.
3. Personal protective measures available to me.
4. Work practices, emergency procedures, and engineering controls available to reduce exposure.
5. The details of the Chemical Hygiene Plan for my laboratory.

OPTIONAL:

Designated Area Training.

By my signature, I certify that I have been informed and received training in the areas indicated. I have been given the opportunity to ask questions pertaining to any of the above topics.

LABORATORY NAME AND NUMBER: _____

OSHA LABORATORY STANDARD

To:

From:

Date:

Subject: Hazardous Chemical Use in Designated Areas

FOLLOW ESTABLISHED PROCEDURES AND STATEMENTS OUTLINED IN SECTION 4.3 AND 4.4. OF CHEMICAL HYGIENE PLAN.

You have recently ordered the chemical _____ which is classified as a _____ substance. Due to the health exposure nature of this substance, special handling procedures are required.

The following describes our policy for handling carcinogenic, reproductive toxins, and highly acute toxic substances. It is your responsibility to follow these procedures. Please read these procedures, sign and copy, have your project supervisor/manager sign the copy and then forward to me. The approved copy will be returned to you, after further review, providing authorization to proceed with the project.

Your cooperation in following these guidelines will insure a safe work environment for everyone.

1. The designated area where the chemical is handled must be clearly labeled with the hazard of that chemical. This includes weighing areas, miscellaneous areas where the chemical may be released, and the work area.
2. The work surfaces of these areas must be covered with an absorbent disposable liner.
3. The work area must be in a properly ventilated area.
4. Wear chemically and solvent resistant gloves when handling these chemicals. These gloves must not leave the work area unless they are thoroughly washed. The user must wear a lab coat, and protective eye protection, if there is a possibility of being splashed.
5. Glassware must be rinsed into the waste container before leaving the designated area.
6. Decontaminate the work surface with an appropriate solvent.

7. Contaminated solid waste must be placed in a leak-proof container and then disposed of as chemical waste. Plastic garbage bags can be used for dry waste, while solvent resistant, wide-mouthed jars can be used for wet waste. Double contain and label.
8. When finished with the chemical, return it to the general chemical stockroom.
9. If there is skin contact with the substance, the area should be flushed immediately with water.
10. If you ordered this chemical for another individual to use, then it is your responsibility to forward this document to the user.

Project Supervisor

CHO Approval