

GWYNEDD MERCY UNIVERSITY
CHEMICAL HYGIENE PLAN
EXECUTIVE SUMMARY
2007
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EXECUTIVE SUMMARY CHEMICAL HYGIENE PLAN

This summary highlights the policies, procedures and regulations set forth in the Gwynedd Mercy University Chemical Hygiene Plan (CHP) and serves as a reference to the location of detailed procedures to be followed in the manual. This summary is not intended to be comprehensive or to replace the complete CHP and its Appendices. The reference pages per section are listed in parenthesis.

CHEMICAL HYGIENE PLAN MANUAL DESIGN

The Gwynedd Mercy University Chemical Hygiene Manual consists of three sections outlined below.

SECTION I – INTRODUCTION AND ADMINISTRATION.....PAGES 7-50

This section contains information regarding the general administrative components of the Chemical Hygiene Plan. This section outlines the purpose, scope, and applicability of the plan. In addition, responsibilities, authority and resources are also defined. Training, medical surveillance, exposure monitoring, hazard identification, recordkeeping, plan evaluation/review, and resources are detailed in this section.

SECTION II – GENERAL SAFETY PRACTICES.....PAGES 51-146

This section contains recommended general precautions for working with laboratory chemicals. These precautions address broad classes of chemicals and include information and guidance in the following areas:

- ❖ Common hazards
- ❖ General safe work practices
- ❖ Chemical storage
- ❖ Personal protective equipment
- ❖ Other safety equipment and engineering controls
- ❖ Work practices for particularly hazardous substances
- ❖ Chemical waste management
- ❖ Emergency procedures

SECTION III – PROCEDURE-SPECIFIC SAFETY PRECAUTIONS.....PAGES 147-154

This section contains policies, procedures or precautions that are required by a specific instructor or laboratory. This section is provided to enable instructors to customize this Chemical Hygiene Plan for operations in which the general precautions in Section II are inadequate. A Procedure-Specific Safety (PSS) form is contained in this section to provide assistance to laboratory instructors in generating specific safety procedures.

SECTION I – INTRODUCTION AND ADMINISTRATION (PAGES 7-50)

1.0 LABORATORY STANDARD (PAGE 7)

The Occupational Safety and Health Administration (OSHA) published standard 29 CFR 1910.1450, “Occupational Exposure to Hazardous Chemicals in Laboratories” to assist academic institutions in enhancing the chemical safety and awareness of personnel in any laboratory setting. This regulation, known as the “Lab Standard,” is designed to protect not only laboratory personnel, but all who may have the potential for contact with chemical or biological hazards within the university community.

The standard’s purpose is to 1) protect personnel working in a laboratory setting from any chemical exposures that exceed permissible exposure limits; 2) to ensure that all personnel are aware and educated on the hazards of the chemicals in their work area and; 3) provide a guide for the best management practices and procedures that should be in place to protect personnel from chemical hazards. The “Lab Standard” requires colleges and universities to devise and implement a chemical hygiene plan which is to be monitored by a Chemical Hygiene Officer (CHO).

2.0 SCOPE AND APPLICABILITY (PAGE 8)

The scope and applicability of this plan are to minimize chemical and biological exposures; work-related injury and illness; risk to the environment; and compliance with applicable Federal, State, and City (including OSHA, EPA, & PA DEP) regulations and standards to assure that laboratory employees work in a healthy and safe environment, with a minimum burden on laboratory teaching activities. Instructors and laboratory personnel are responsible for maintaining common-sense safety habits and for conducting themselves in such a way that risks associated with hazards are minimized. This CHP has been developed in accordance with “The OSHA Laboratory Standard 29 CFR 1910.1450) and all regulations therein.

3.0 HAZARD CHEMICAL DEFINITIONS (PAGES 10-15)

According to the Laboratory Standard, “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 employees. Health hazards include chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, and neurotoxins, agents which act on the hematopoietic systems and agents which damage the lungs, skin, eyes, or mucous membranes. Physical hazards include chemicals for which there is scientifically valid evidence that they are combustible liquids, a compressed gas, explosive, flammable, organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water reactive.

4.0 ROLES AND RESPONSIBILITIES (PAGES 15-18)

The President of the University has the ultimate responsibility for chemical safety within the institution. **The Vice-President of Finance and Administration** is responsible for the oversight of all components of chemical safety within the institution including but not limited to the authorization, development, and enforcement of environmental safety compliance programs and the coordination of funding for implemented programs. Additional responsibilities may be found in the following pages:

Environmental Safety Committee.....	15
Environmental Safety Manager/CHO	15
Director of Physical Plant.....	16
Director of Public Safety.....	16
Director of Health Services.....	16-17
Dept. of Human Resources.....	17
Department Employees.....	17-18

5.0 INFORMATION AND TRAINING (PAGES 18-22)

Gwynedd Mercy University will provide laboratory personnel with information and training to ensure that they are apprised of the hazards of the chemicals present in their work area.

5.1 General Information (PAGES 18-19)

- ❖ A copy of the OSHA Lab Standard and its appendices.
- ❖ The location and availability of the Chemical Hygiene Plan.
- ❖ The Permissible Exposure Limits (PELs) for OSHA-regulated substances and the AGCIH Threshold Limit Values (TLVs) for hazardous substances not given in OSHA PELs. PELs are found in Appendix II-I.
- ❖ Signs and symptoms associated with exposure to hazardous substances used in the laboratory.
- ❖ The location and availability of known reference materials on hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory.
- ❖ SDS for any chemical used in the laboratory.

5.2 Safety Training (PAGE 19)

- ❖ **General Laboratory Safety Training** regarding general laboratory safety practices, provided by the Office of Environmental Safety. General training may be outsourced to qualified professionals or developed in house through online modules.
- ❖ **Procedure-Specific Safety Training** regarding specific chemicals, experiments or procedures provided by the instructor or Laboratory Manager.

6.0 CHEMICAL EXPOSURE, MEDICAL EXAMINATION, & EXPOSURE MONITORING (PAGES 22-24)

The hazards of laboratory chemicals can be ascertained by referring to label and SDS information, as well as additional health and safety reference materials. In addition, the ability to recognize the signs and symptoms of chemical exposure is important.

6.1 Signs & Symptoms (PAGE 22)

- ❖ Skin that has become dried, whitened, reddened, swelled, blistered and itchy or exhibits a rash
- ❖ A chemical odor. Many chemicals can be smelled at concentrations well below harmful levels. A chemical may be present without a detectable odor
- ❖ A chemical taste. Some chemicals have characteristic tastes
- ❖ Tearing or burning of the eyes
- ❖ Burning sensations of the skin, nose or throat
- ❖ Cough
- ❖ Headache or dizziness

6.2 Medical Examination (PAGES 22-23)

Report to the Health Services immediately located in Loyola Hall. Gwynedd Mercy University is required to provide anyone working with hazardous chemicals the opportunity to receive medical attention from Health Services when exposed to chemicals that result in bodily harm.

6.3 Exposure Monitoring (PAGE 24)

Regular environmental or employee exposure monitoring of airborne contaminants is not usually warranted or practical in laboratories, since chemicals are typically used for a relatively short period of time and in small quantities. However, air monitoring will be conducted if general symptoms of chemical over-exposure occur and the employee requests monitoring.

7.0 RECORD KEEPING (PAGES 24-25)

Gwynedd Mercy University will maintain accurate and complete records in the employee files concerning medical examination and consultation, exposure monitoring, & training.

8.0 PLAN EVALUATION AND UPDATES (PAGES 25-26)

In order to evaluate the implementation status and effectiveness of the CHP, monthly internal inspections will be performed to review laboratory safety practices and check safety equipment. These evaluations will be made available to laboratory personnel and those responsible for the implementation of this program for the University. The

Environmental Safety Committee will review annually and make updates, if necessary, to this CHP. Changes to the plan will be based on regulatory changes, changes in University-wide safety practices, feedback from laboratory personnel and the results of internal and external inspections.

9.0 APPENDIX I (PAGES 27-50)

I-A Chemical Hygiene Plan Awareness and Commitment Record.....	27-28
I-B Understanding SDS.....	29-31
I-C SDS Request Form.....	32-33
I-D Laboratory Checklist and Recommendation Report.....	34-38
I-E The Laboratory Standard (29 CFR 1910.1450).....	39-50

SECTION II – GENERAL SAFETY PRACTICES (PAGES 51-146)

10.0 ENGINEERING, ADMINISTRATIVE, AND PERSONAL PROTECTION (PAGES 54-55)

The nature of the hazardous chemical and the routes by which it enters or contacts the body determine the type of controls that are needed. Regardless of the established exposure limit for a particular chemical, all laboratory workers should take steps to minimize chemical exposure via all routes of entry. Three methods are used to limit chemical exposure are Engineering Controls, Administrative Controls, and Personal Protective Equipment.

11.0 GENERAL SAFETY PROCEDURES (PAGES 56-57)

All laboratory personnel, instructors, laboratory assistants, and student laboratory assistants should take the following precautions.

11.1 Basic Precautions (PAGE 56)

- ❖ Assume unfamiliar chemicals are hazardous
- ❖ Review the safety and health hazard data of all chemicals used in the laboratory
- ❖ Know the signs and symptoms of overexposure and the physical and sensory characteristics (odor, appearance) of these chemicals
- ❖ Know appropriate procedures for emergencies
- ❖ Avoid distraction
- ❖ Have a second person nearby or maintain surveillance by telephone contact
- ❖ Avoid leaving experiments unattended
- ❖ Never use unlabeled chemicals or chemicals whose labels cannot be read
- ❖ Always order the least amount of chemical possible
- ❖ Always use PPE
- ❖ Use a fume hood whenever possible
- ❖ Maintain and inspect all equipment for proper function
- ❖ Use guards and shields when possible

- ❖ Store and handle chemicals in the appropriate manner
- ❖ Store hazardous waste accordingly
- ❖ Pouring chemicals into the sink is prohibited by law
- ❖ Do not eat, drink, smoke, chew gum, or apply cosmetics in the laboratory
- ❖ Do not store food or beverages in the laboratory
- ❖ Do not mouth pipette. Use a mechanical pipette or aspirator
- ❖ Do not use chipped or cracked glassware
- ❖ Report ALL accidents even if they do not result in injury

11.2 Housekeeping & Hygiene (PAGE 57)

- ❖ Work areas should be kept clean and free from obstruction
- ❖ Hands should be washed after every experiment, before touching any non-contaminated area or object, and before leaving the laboratory area
- ❖ Access to exits, aisles, hallways and controls must never be blocked
- ❖ Emergency exits must be kept unlocked from the inside
- ❖ Hallways should not be used as chemical storage areas
- ❖ Work areas should be cleaned at the end of the experiment and the end of the day

12.0 CHEMICAL STORAGE (PAGES 57-61)

Many potential hazards are associated with the storage and handling of laboratory chemicals. These hazards may be minimized by understanding the properties of the chemicals and planning procedures by which they may be handled safely. Flammable, corrosive, explosive, and peroxide forming agents require special precautions which can be found in pages 58-61.

12.1 Chemical Handling (PAGE 57)

Use bottle carriers to transport chemicals. Close caps securely. Pour all chemicals carefully. Add acid to water, not water to acid.

12.2 Incompatible Chemicals (PAGE 57)

Incompatible chemicals must not be stored together. For each chemical, the hazardous nature must be considered individually and in relation to other chemicals in the area. Appendix II-A contains a table of common incompatible chemicals.

12.3 Excessive Storage (PAGE 57)

Avoid stockpiling chemicals. Only purchase what is needed. Use older stock first. Discard chemicals, which are no longer needed or that have expired.

12.4 Fume Hoods (PAGE 58)

Fume hoods should not be used for the general storage of *unused* chemicals. However, chemicals prepared for use during lab may be kept in secondary containment until the hood is in use or stored in secondary containment if the hood is specifically designated for the general storage of chemicals and is not used in experimental procedures.

13.0 PERSONAL PROTECTIVE EQUIPMENT (PAGES 62-63)

The use of personal protective equipment is necessary when feasible engineering and administrative controls are unavailable or if there is a need to supplement those controls.

13.1 Body and Foot Protection (PAGE 62)

When working with chemicals, a lab coat or apron and closed-toed shoes must be worn at all times. Hair and loose clothing should be confined.

13.2 Hand Protection (PAGE 62)

Hands are the most likely part of the body to come in contact with chemicals. Skin contact with chemicals may result in irritation, burns, or absorption of the chemical into the blood stream. Nitrile gloves only are used in all Natural Sciences laboratories.

13.3 Eye Protection (PAGE S 62-63)

Safety goggles, glasses, or face shields should always be worn when eye hazards are possible. Safety glasses are provided in most laboratories and goggles may be purchased from the Laboratory Manager or at the campus bookstore. All instructors and students working with chemicals must wear eye protection.

14.0 ADDITIONAL SAFETY EQUIPMENT & USAGE (PAGES 63-65)

14.1 Fume Hoods (PAGE 63)

Fume hoods are one of the most important safety devices in the laboratory.

Use: The ventilation system in the laboratory has been carefully balanced to ensure proper airflow and comfortable working conditions. To prevent cross drafts, laboratory doors should be kept closed whenever possible. A complete guide to proper use of a laboratory fume hood is contained in Appendix II-H.

14.2 Eyewash Stations (PAGES 63-64)

Eyewashes are required in any lab where there is the potential for eye injury from exposure to hazardous chemicals.

Use: After any eye contact with a chemical, activate the eyewash station and flush eyes for at least 15 minutes. If the chemical is alkaline, flush for at least 30 minutes. Avoid

rinsing the chemical into the uninjured eye. If contact lenses are in place, flush for one minute, remove the lenses, and continue flushing. After flushing for the appropriate amount of time, seek medical attention at the university's health services or nearest emergency room.

14.3 Safety Showers (PAGE 64)

Showers should be provided where chemicals are handled. The showers provide first aid for chemical splashes.

Use: In case of skin contact with a hazardous chemical, immediately activate the shower by pulling down the lever and flush the affected area for at least 15 minutes. If the chemical is alkaline, flush for at least 30 minutes. For contact with dry solids, brush the contaminant gently off the skin before using the shower. While under the shower remove clothing and jewelry from the affected area. After flushing seek medical attention immediately at Health Services or the nearest emergency room.

14.4 Fire Extinguishers (PAGES 64-65)

Fire extinguishers are necessary for the rapid suppression of small fires. Only people trained in the use of a fire extinguisher should operate one. Never try to fight a fire that is larger than you are. Fire extinguisher safety training is offered twice per year and is conducted by the Wissahicken Fire Company.

Use: Before using a fire extinguisher, **SOUND THE ALARM**, and call ext. 111 to report the fire. If the fire is small and you are trained to use a fire extinguisher, you may begin to use the extinguisher. Stand at the entrance of the room and point the nozzle above the fire with a side to side motion. If the fire becomes larger than you, or the contents of the extinguisher have been discharged and the fire is still burning, evacuate the building closing doors behind you (but do not lock them).

15.0 Chemical Waste Management (PAGES 65-67)

15.1 Common Laboratory Wastes (PAGE 65)

- ❖ **Spent solvents, acids, bases and oxidizers** used in extractions, cleaning or other processes.
- ❖ **Unused reagents and other chemicals** that are no longer needed, do not meet specifications, are contaminated, have exceeded their storage life or are otherwise unusable in the lab.
- ❖ **Waste oils**
- ❖ **Other miscellaneous materials**, including broken thermometers, heavy metal salts, poisons, etc

15.2 Chemical Storage (PAGE 66)

Hazardous waste in laboratories is stored in clearly labeled Satellite Accumulation Areas (SAA). These areas are normally located in the fume hoods when hood is not in use. They may also be located in secondary containment on a secured, unused portion of the bench top.

15.3 Chemical Disposal (PAGE 66)

Once a waste container in the SAA is filled, it must be dated and transferred to the Central Storage Area (CSA-Keiss Hall 216) within 72 hours. The ESM is available to provide waste pick up services. *Disposal of hazardous wastes in sinks is prohibited by regulation.*

15.4 Chemical Labeling (PAGE 66)

Containers that accumulate and store hazardous waste must be visibly labeled with the following information:

- ❖ The words “Hazardous Waste”
- ❖ The waste type in words (chemical abbreviations/formulas are not permitted)
- ❖ The associated hazard in words, the hazard diamond may also be used
- ❖ The date upon which the container became filled
- ❖ The generators name

16.0 EMERGENCY PROCEDURES (PAGES 67-73)

16.1 Medical Emergency (PAGE 67)

Procedures:

- ❖ Remain calm
- ❖ Call for medical assistance, 911, or assign another person to call
- ❖ Initiate lifesaving measures if required *only if trained to provide treatment*
- ❖ Do not move a victim unless there is a danger of further harm
- ❖ Keep the victim warm
- ❖ Remain with the victim until medical assistance arrives
- ❖ Report incident to supervisor

16.2 Fire Emergency (PAGES 67-68)

Procedures:

- ❖ **R Rescue:** When you discover a fire, rescue people in immediate danger if you can do so without endangering yourself. Alert others in the immediate area and exit the building via a safe fire exit. **Do not use elevators.**
- ❖ **A Alarm:** Sound the alarm by pulling the alarm pull station nearest you and call the fire department from a safe distance.
- ❖ **C Confine:** Close all doors, windows and other openings, if it is safe to do so
- ❖ **E Evacuate:** Evacuate the building and gather at the designated meeting site

NEVER enter a room that is smoke filled OR if the door handle is warm to touch
16.3 Chemical Spill (PAGES 68-71)

Minor Chemical spill “Incidental Spill”

- ❖ Alert people in the immediate area of spill.
- ❖ Notify the ESM or Laboratory Manager for assistance.
- ❖ If material is flammable, turn off ignition and/or heat sources and isolate incompatibles or reactive chemical substances, if this can be accomplished safely.
- ❖ Use an appropriate kit to neutralize and/or absorb the spill. Kits are found in Lab Support room 251 in Keiss Hall.
- ❖ Wear protective equipment, including safety goggles, gloves that are impervious to the chemical spilled, long-sleeved clothing, and impervious shoes or boots.
- ❖ Avoid breathing vapors from the spill.
- ❖ Increase ventilation in the area of the spill.
- ❖ Confine the spill to the smallest area possible.
- ❖ Do not walk through the spilled chemical.
- ❖ Cover or block environmental receptors such as sinks or floor drains to prevent spilled materials from reaching the outdoors.
- ❖ Collect neutralized and/ or absorbed materials, including broken glass, place in an appropriate container, label as hazardous waste, and store in Satellite Accumulation Area. Waste must be transferred to the CSA within 72 hours.
- ❖ After a spill is thoroughly cleaned or neutralized, clean contaminated area with soap and water.

Major Chemical Spill “Non-Incidental Spill”

- ❖ Attend to any injured or contaminated persons and remove them from exposure
- ❖ Notify Public Safety ext. 111, the ESM, and/or Laboratory Manager and give them the following information:
 - ❖ Name of chemical.
 - ❖ Location of spill.
 - ❖ Amount released to the environment.
 - ❖ Nature and extent of any injuries.
 - ❖ Assessment of potential hazard to human health (obtain SDS).
 - ❖ Your name, location and telephone number where you may be reached.
- ❖ Obtain medical assistance, if necessary.
- ❖ Alert people in the facility to evacuate to a safe distance or to the designated meeting place.

- ❖ Avoid breathing vapors from the spill.
- ❖ Do not walk through the spilled chemical.
- ❖ If material is flammable, turn off ignition and/or heat sources and isolate incompatibles or reactive chemical substances, if this can be accomplished safely
- ❖ Close doors to the affected area
- ❖ Post “Do Not Enter” signs or barrier tape at all entrances to the affected area
- ❖ Assign a person knowledgeable of the incident and facility to assist emergency personnel from a safe distance

16.4 Biological Spill (PAGES 71-73)

Procedures:

- ❖ Alert people in immediate area.
- ❖ Put on protective equipment.
- ❖ Cover an area twice the size of the spill with disinfectant soaked-paper towels. Or, surround spill with dry disinfectant as per label directions.
- ❖ Allow a 15 minute contact period.
- ❖ Wipe down any contaminated stationary equipment or furniture with disinfectant.
- ❖ Use forceps, tongs, or broom to remove broken glass and other items; place in sharps container or red bag.
- ❖ **Do NOT put broken contaminated glass into the broken glass bin.**
- ❖ Remove towels and re-clean area with disinfectant solution.
- ❖ Decontaminate (autoclave, chemical treatment) reusable clean-up items and other reusable equipment.

17.0 APPENDIX II (PAGES 74-146)

II-A Chemical Compatibility.....	74-77
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II-C Common Laboratory Flammables and Combustibles.....	80-82
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SECTION III – PROCEDURE-SPECIFIC SAFETY (PSS) PRACTICES

18.0 INTRODUCTION, PSS INSTRUCTIONS, APPENDIX (PAGES 147-154)

19.0 APPENDIX III

III-A PSS Form.....152-154