

**On-line Laboratory Safety Training
University Police and Safety Office (UP&SO)
Module 7**

Principal Investigator Topics

Material Important for
Research Leaders and
Principal Investigators
in Laboratories

How to Complete This Training:

1. View the slides in ALL of the modules contained under the “On-line Laboratory Safety Training” link.
2. Download, print, and complete the Laboratory Safety Review as instructed at the end of each module.
3. Once all module review sheets (quizzes) are completed, submit them to Health Technician Ted Jirik at the Safety Office. Address questions to Ted.Jirik@ndsu.edu or call at 231-8040.

Topical Areas—All Modules

- Introduction
- Employee Right to Know
- Waste Handling and Disposal
- Fire and Electrical Safety
- Radiation Hazards
- Biological Hazards
- Nanotechnology Safety
- **Principal Investigator Responsibilities**

Topical Areas—This Module

- In this module we will cover topics associated with Principal Investigator responsibilities, specifically:
 - Compliance with applicable regulations
 - Understanding the different training requirements
 - Preparation of Standard Operating Procedures
 - Maintenance of material inventories
 - Meeting laboratory specific training requirements

Goals of NDSU Concerning Safe Laboratory Use:

- Comply with state/federal regulations.
- Support the safe work habits of employees and students.
- Empower the Laboratory and Chemical Safety Committee to address safety issues.
- Support the requirements of the Chemical Hygiene Plan (CHP).

Additional Laboratory Training and Information Available:

Biohazards/Bloodborne Pathogen:

- Required training if working with biological agents (NDSU Institutional Biosafety Committee).

Radiation Hazards:

- Required training if working with radioactive agents (NDSU Radiation Safety Committee).

Standard Operating Procedures (SOP's):

- Required to review written procedures addressing unique laboratory hazards (laboratory supervisor).

Laboratory Levels of Responsibility

- Principal Investigator or Instructional Supervisor Must:
 - Provide safety training for specific practices.
 - Require employees and students under their supervision to follow safety procedures.
 - Require employees and students to use appropriate personal protective equipment (PPE), i.e. disposable gloves and eye protection.
 - Report to Associate Director of Environment Health, Mike Borr, any accidental spills or potential exposure involving toxic substances (1-7759).
- Employees and Students Must:
 - Follow safety procedures.
 - Use personal protective equipment (PPE).
 - Use hazardous materials only in approved facilities.

II. Laboratory Safety Program

- A. Inventory Control: Have an updated list of hazardous chemicals in your possession.
- B. Training: Provide training to employees and students.
- C. Control Strategy: Plan how to work safely.

Principal Investigator (PI)

- Is accountable for each hazardous substance in laboratory:
 - From time of receipt to time of final disposal or depletion.
- Must have current inventory of hazardous chemicals
 - Name of substance.
 - Amount of substance.
 - Hazard classification of substance.
- Must check that all hazardous chemicals have a corresponding Material Safety Data Sheet (MSDS)
- Must check that all containers of chemicals are labeled.
 - Name and Hazards of chemical (flammable, toxic, reactive, unique hazard).
- Will train students and staff in hazards and way to use chemicals safely before initial use of chemicals.
- Responsible for:
 - Each hazardous substance in possession.
 - Each potential hazardous operation in laboratory.

Each lab must have a Material Safety Data Sheet (MSDS) File:

- For each material used in laboratory.
- Visible from entrance to the laboratory.
- Safety Office has green binders for this use.
- No substance can be used until an MSDS for that material is present.
- Storage limits for each building for hazardous materials must not be exceeded.
- All containers of hazardous materials must be labeled according to NFPA code (see MSDS for ranking information).

Laboratory MSDS use:

- MSDS must be received and understood before use of a chemical begins in the laboratory.
- Synthesized chemicals. Labeled by contents. Date of synthesis. Owner. NFPA label according to analogous materials or most hazardous material included in synthesis.

Laboratory Standard Operating Procedures (SOP's):

- Written down and kept in central location.
- Chemicals used – poisonous, reactive, incompatibles, flammable, unique hazards). Reference applicable (MSDS's).
- Electrical hazards – When working with water – use of GFCI is recommended. Non-grounded (round prong on plug removed) appliances can be cause for electrocutions. “Digging” into electrical equipment which is still plugged in.
- Mechanical hazards – no guard on equipment with spinning belts, pulleys, chains and sprockets.
- Biological hazards – Blood carried microorganisms – Hepatitis, HIV/Aids, etc. Additional training and protective measures required.

SOP's Continued

- Laser hazards – Receive training from PI, department and use recommended personal protective equipment.
- Radioactive isotope hazards – Additional training and protective measures required.
- Other unique hazards: Acetone mixed with nitric/sulfuric acid solution – violently explosive. Cryogenics-can use life threatening oxygen deficient environment. Outdated ethers-explosion hazard. Some chemicals will auto ignite if not properly cooled/refrigerated.
- What protective measures to use: use of fume hood, safety goggles, safety gloves and chemical apron: assuring incompatible chemicals are separated: installation of guards on equipment: getting required training before using hazardous chemicals, biohazards, radioactive materials, lasers, etc.: making sure electrical cords and plugs are in good condition: Use of Ground Fault Circuit Interrupters (GFCI's) when working near water in the laboratory.

Chemical Hygiene Plan (CHP) Resource Consists of:

- I. Introduction, p. 1.
- II. Safety Program, p. 3.
- III. Emergency Procedures, p. 10.
- IV. Chemical Waste Management, p. 10.
- Appendix 1 – Guidance on Spills and Other Accidents, p. 13.
- Appendix 2 – Chemical Waste Removal, p. 16.
- Appendix 3 – Definitions, p. 17.
- Appendix 4 – Hazardous Waste Form, p. 21.
- Appendix 5 – Chemical Disposal Handling Codes, p. 22.

PI Topics Summary

- In this module we covered topics associated with Principal Investigator responsibilities, specifically:
 - Compliance with applicable regulations
 - Understanding the different training requirements
 - Preparation of Standard Operating Procedures
 - Maintenance of material inventories
 - Meeting laboratory specific training requirements
- Next, download and print the review sheet for the material in this module. Fill in the answers using the information we just covered. Hold onto this completed form and submit it along with the other review sheets from each of the modules once they have all been completed. Send the set of completed forms to Ted Jirik at the Safety Office.
- If you progressed through the training in numerical order you have now completed all modules of the Laboratory and Chemical Safety Training. Send the seven completed review forms (quizzes) to Ted Jirik at the Safety Office.