Wausau School District Chemical Hygiene Plan
Revised 2005

I. PURPOSE

This Chemical Hygiene Plan (CHP) sets forth policies, procedures, equipment, personal protective equipment, and work practices that are capable of protecting employees and students from the health hazards presented by hazardous chemicals used in laboratories. This Plan is intended to meet the requirements of 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories, a copy of which is found in this manual.

II. SCOPE

This CHP applies to our Science Laboratories where employees work with substances in which the containers used for reactions, transfers, and other handling of substances are easily and safely manipulated by one person. The objective of this program is to provide guidance to all laboratory personnel who use chemicals, so that they can perform their work safely.

Laboratory Employees – Each individual working in a laboratory should be informed about hazards associated with that laboratory and the specific work going on there. This includes all staff, students, and assistants.

Support Personnel – Storeroom, janitorial, and maintenance personnel may be exposed to potential physical and chemical hazards from work carried out in the laboratory. They must be informed about the risks involved and trained how to avoid potential hazards.

III. RESPONSIBILITIES

A. A chemistry teacher appointed by the Science Dept. chair of each high school shall make up the Chemical Hygiene Officers and shall:

- work with administrators and other faculty to develop and implement acceptable, appropriate chemical hygiene policies and practices.
- Monitor procurement and use of chemicals in the lab. Determining that laboratory facilities and training levels are adequate for chemicals in use.
- Perform regular chemical hygiene and housekeeping inspections that include inspections of emergency equipment.
- Maintain a current chemical inventory of science chemicals present within the Wausau School District property
- Review Chemical Hygiene Plan on an annual basis

- Maintain overall responsibility for the safe operation of the Chemistry, Biology, and Physics Laboratories.
- Ensure that workers/students know and follow the chemical hygiene rules
- Determine the proper level of personal protective equipment. Ensure that such protective equipment is available and in working order.
- Ensure that appropriate training has been provided to employees.

B. Supervisors – Directly responsible for chemical hygiene in the laboratory. The supervisor, typically the instructor, is required to ensure that provisions of the CHP are being followed in the laboratory.

C. Students – Responsible for planning and conducting each operation in accordance with prescribed chemical hygiene procedures.

IV. Standard Operating Procedures for Laboratory Chemicals

A. Chemical Procurement

The decision to procure a chemical shall be completed by the Chemical Hygiene Committee. A commitment of safe handling and use of a chemical from initial receipt to ultimate disposal will always be adhered to.

The Wausau School District's policy is to aggressively and continually evaluate current inventory and properly dispose of unnecessary materials.

Information on proper handling, storage, and disposal shall be identified by the Chemical hygiene Committee prior to procurement of a chemical. If, upon investigation, the chemical is either extremely hazardous (e.g. mutagenic, carcinogenic, teratogenic), extremely flammable and/or explosive, or difficult to dispose of, the Committee shall not allow procurement.

In addition, chemicals used in the laboratory shall be those which are appropriate for the ventilation system.

Science Instructors, or a designated, trained person will transport the materials to the Chemical Storage area.

Chemical containers shall not be accepted without accompanying labels, material safety data sheets, and packaging in accordance with Wausau School District's policy. All chemical shipments should be dated when received and opened.

B. Chemical Storage

Received chemicals shall be immediately moved to the designated Chemical Storage areas by one of the Science Instructors. Large glass containers shall either remain in their original shipping container or be placed in carrying containers (e.g. rubber "boots") during transportation.

The storage area shall be well illuminated. Large bottles (e.g. gallon) shall be stored no more than two feet from ground level. Flammables will be stored in the designated flammable storage cabinet in the Chemical Storage area.

Chemicals must be segregated by hazard classification and compatibility in a well-identified area, with good general exhaust ventilation.

Mineral acids should be segregated from flammable and combustible materials. Separation is defined by NFPA 49 as storage within the same fire area but separated by as much space as practicable or by intervening storage from incompatible materials.

Nitric Acid will be stored in a separate acid cabinet, or within a separate compartment in the acid cabinet.

Acid resistant trays shall be placed under bottles of mineral acids.

Acid sensitive materials, such as cyanides and sulfides, shall be separated from acids or protected from contact with acids and water.

Highly toxic chemicals or other chemicals whose containers have been compromised shall be stored in unbreakable secondary containers.

The storage area shall NOT be used for preparation or repackaging area.

The storage area shall be accessible during normal working hours. The storage area is under the control of the Science Dept. and Science Instructors.

Storage of chemicals at the lab bench or other work area shall be limited to those amounts necessary for one operation shift. The amount of chemicals at the lab bench shall be as small as possible.

Stored chemicals shall be examined annually by the Chemical Hygiene Officers for container integrity and/or deterioration. The inspection should determine whether any corrosion, deterioration, or damage has occurred to the storage facility as a result of leaking chemicals.

Periodic inventories of chemicals outside the storage area shall be conducted by the Chemical Hygiene Officers. Unneeded items shall be properly discarded or returned to the storage area.

C. Chemical Handling

Each Laboratory employee/student (with the training, education, and resources provided by supervision), shall develop work habits consistent with requirements of Wausau School District's CHP to minimize potential personal and coworker exposure to chemicals. 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. Skin contact with chemicals shall be avoided at all times.
2. Employees shall wash all areas of exposed skin prior to leaving the laboratory.
3. Mouth suction for pipetting or starting a siphon is prohibited.
4. Eating, drinking, smoking, chewing gum, or application of cosmetics in the laboratory is prohibited.
5. Storage of food or beverages is not allowed in storage areas or refrigerators used for laboratory operations.
6. Determination of risks shall be conservative in nature.
7. Any chemical mixture shall be assumed to be as toxic as its most toxic component.
8. Substances of unknown toxicity shall be assumed to be toxic.
9. Laboratory employees/students shall be familiar with the symptoms of exposure for the chemicals which they work with and the precautions necessary to prevent exposure.
10. The intent and procedures of this CHP shall be continually adhered to.
11. In all cases of chemical exposure, the Permissible Exposure Limits (PEL's) of WI Comm. 32.35 shall not be exceeded.
12. Engineering controls and safety equipment in the laboratory shall be utilized and inspected in accordance with guidelines established in the CHP.
13. An inspection log which documents eyewash/shower function will be maintained by each laboratory supervisor.
14. Specific precautions based on the toxicological characteristics of individual chemicals shall be implemented as deemed necessary by the CHP.

D. Laboratory Equipment and Glassware

Each employee/student shall keep the work area clean and uncluttered. All chemicals and equipment shall be properly labeled, in accordance with Wausau School District's CHP guidelines.

At the completion of each work day or operation, the work area shall be thoroughly cleaned and all equipment properly cleaned and stowed.

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

1. All laboratory equipment shall be used for only its intended purpose.
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.
3. All evacuated glass apparatus shall be shielded to contain chemicals and glass fragments should implosion occur.
4. Labels shall be attached to all chemical containers, identifying the contents and related hazards.
5. Waste receptacles shall be labeled as such.
6. All laboratory equipment shall be inspected on a periodic basis and replaced or repaired as necessary.

E. Personal Protective Equipment

Safety glasses meeting ANSI Z87.1 are required for employees and visitors to the laboratory and will be worn at all times when chemicals are being used or manipulated in the laboratory.

The wearing of contact lenses in the laboratory is strongly discouraged.

Chemical goggles and/or a full face shield shall be worn during chemical transfer and handling operations as procedures dictate.

Chemical resistant aprons should be worn in the laboratory. Aprons shall be removed immediately upon discovery of significant contamination.

Appropriate chemical-resistant gloves shall be worn at all times when there exists the potential for skin contact with chemicals.

Used gloves shall be inspected and decontaminated prior to use. Damaged or deteriorated gloves will be immediately replaced. Gloves should be rinsed/washed prior to removal from hands.

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.

No chemicals shall be used in such quantities or in such a way as to require the use of a respirator.

F. Personal Work Practices

Laboratory supervision must ensure that each student knows and follows laboratory specific rules and procedures established by this plan. For example, safety rules in Biology may differ from those in Chemistry.

All employees/students 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 promptly correct unsafe practices or conditions.

Long hair or loose fitting clothing shall be confined close to the body to avoid contact with the chemicals or being caught in moving/machine parts.

Use only those chemicals appropriate for the ventilation system.

Avoid unnecessary exposure to all chemicals by any route.

Do not smell or taste chemicals.

Encourage safe work practices in coworkers by setting the proper example. Horseplay is strictly forbidden.

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

Use engineering controls in accordance with CHP procedures.

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

G. Labeling

All containers in the laboratory shall be labeled. This includes chemical containers and waste containers. The labels shall be informative and durable, and at a minimum, will identify contents, source, date of acquisition, and indication of hazard.

Portable containers shall be labeled by the individual using the container with a grease pencil.

Exemptions for labeling requirements shall be made for chemical transfers from a labeled container into a container which is intended only for immediate use of the employee who performed the transfer.

The labeling program shall be periodically inspected by the chemical hygiene officers to ensure that labels have not been defaced or removed.

V. CRITERIA FOR IMPLEMENTATION OF CONTROL MEASURES

A. When to use fume hoods:
Hoods should be used whenever possible to contain and exhaust toxic, offensive, or flammable materials. Processes that have potential for generating hazardous airborne chemical concentrations should be carried out within the fume hood.

B When to use safety shields or other containment devices:
Safety shields must be used where the possibility exists for laboratory scale detonation. Protective devices, such as long and short-handled tongs for holding or manipulating hazardous items should be used whenever possible.

C When to use personal protective equipment:
Eye protection – Safety goggles or laboratory splash glasses must be worn by all personnel in the laboratory whenever hazardous chemicals are in use.

Gloves – Chemical resistant gloves should be worn to protect the skin from chemical and physical exposures. Soiled or damaged gloves should be decontaminated and disposed of properly.

VI. FUME HOOD MANAGEMENT

A Frequency and type of monitoring – all local exhaust hoods used for primary containment control will be monitored for adequate airflow on a annual schedule. The survey will be completed with a calibrated velometer.

B Acceptable operating range – Minimum average face velocities of at least 100 linear fpm must be maintained for each hood. If the face velocity average does not meet recommended minimum of 100linear fpm, maintenance personnel must be contacted to repair or upgrade the hood.

C Maintenance schedule – Maintenance of local exhausts or fume hoods will be completed on an "as needed" basis or annually, whichever comes first.

VII. EMPLOYEE TRAINING

1. Employees will be provided with training to ensure that they are apprised of the hazards of chemicals present in their work area. Such training will be provided at the time of the employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. Refresher training will be provided annually.

2. Students will receive safety training in conjunction with the course curriculum, as provided by the instructor.

3. Employee training will include:

    a. The contents of this standard and its appendices which shall be made available to employees.
    b. The location and availability of the employer's Chemical Hygiene Plan
    c. Signs and symptoms associated with exposures to hazardous chemicals used in laboratory.
    d. The location and availability of known reference material on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, Material Safety Data Sheets received from the chemical supplier.
    e. Methods and observations that may be used to detect the presence or release of a hazardous chemical.
    f. The physical and health hazards of chemicals in work area.
    g. Measures employees can take to protect themselves form these hazards.
    h. Applicable details of the Chemical Hygiene Plan.

VIII. MEDICAL CONSULTATION AND EXAMINATION

A An employee who works with hazardous chemicals and:

- Develops symptoms associated with a hazardous chemical to which the employee may have been exposed in the laboratory
- Works where exposure monitoring reveals an exposure level routinely above the OSHA action level or, in the absence of a designated action level, exposure above the WI Comm. 32.35 Permissible Exposure Limit, for regulated substances for which there are medical monitoring and medical surveillance requirements. Chemicals that fall within this category are:

Asbestos, Vinyl Chloride, Inorganic Arsenic, Lead, Benzene, Coke Oven Emissions, Cotton Dust, 1, 2-Dibromo-3-Chloropropane, Acrylonitrile, Ethylene Oxide, Formaldehyde, Carbon Tetrachloride

- Or is exposed to a hazardous chemical during a spill, leak, or explosion or other occurrence resulting in exposure is entitled to medical attention including examination and follow-up exams as deemed necessary by the physician.

B Procedures to medical consultation and examination:

1. Seek medical care at a health care provider.
2. The employer will provide the following information to the physician:
   a. Identity of hazardous chemical
   b. Description of conditions under which exposure occurred.
   c. Description of signs and symptoms employee is experiencing.
3. A written opinion from the physician shall be provided to the employer including:
   a. Recommendation for further medical follow-up
   b. Results of medical exams and tests.
   c. Any Medical condition revealed during the exam that places the employee at increased risk.
   d. A statement that the employee has been informed by the physician of the results of the exam and any medical condition that may require further treatment or examination.

IX. EMERGENCY RESPONSE/CHEMICAL SPILLS

A. When chemical spills occur within the laboratory, the following procedures are followed to prevent injury or property loss:

1. Provide any first aid (if necessary) to affected personnel. Liberally use eyewash station and/or safety shower to flush affected areas. It is recommended that flushing continue for AT LEAST 15 minutes. A large exposure to the body merits ambulatory service.
2. Notify supervision of spill. If spill is large or extremely hazardous, the Principal and Maintenance Supervisor will be notified. First Aid personnel may require notification.
3. Evacuate students from the area.
4. If spilled materials exhibit flammability, eliminate ignition sources, such as hot plates, Bunsen burners, etc.
5. Avoid all contact with spilled material. If necessary don appropriate gloves, gown, and goggles.
6. Obtain supplies from Chemical Spill Clean up Kit.
7. Neutralize acids and bases.
8. Contain collected materials and label container with name of contents and also as Hazardous Waste.

9. Always refer to MSDS for special precautions or spill clean up requirements.
10. If the spill is greater than one person can clean up, call Fire Dept.

B. Liquid Spills

1. Confine spill to small area as practical.
2. For small quantities of acids or bases, use the neutralizing agent from the chemical spill clean up kit. An absorbent material specially prepared for acid/base spills may also be used.
3. For small quantities of other materials, such as organic solvents, utilize an absorbent material to clean up spill. Examples of absorbent materials are vermiculite, dry sand, paper towels, etc.
4. For large quantities of inorganic acids and bases, flush with large amounts of water, preferably toward a containment area or drain. CAUTION must be taken not to add too much water to create a flood which may react with water-reactive materials and cause spattering and additional personnel exposure.
5. If possible, utilize a mop to pick up much as much of the spilled material as possible. An excellent clean up device is the mop bucket and wringer to collect the liquid.
6. Carefully pick up and decontaminate bottles, broken glass, and/or other containers. Decontaminate over the bucket or pail to collect contaminated wash.
7. Avoid using any shop vacuum which is not rated for chemical clean up. A potential exists for atomizing hazardous wastes and creating a potential human inhalation exposure.
8. If the spill is extremely volatile (high vapor pressure), allow the spill to evaporate and exhaust out the laboratory exhaust. (e.g. fume hood)
9. Properly containerize, label, store, and/or dispose of collected hazardous waste.

C. Solid Spills

1. If possible, sweep solid spills of low toxicity into a designated, easily decontaminated, dust pan and place in a labeled container for storage and/or disposal.

D. Additional Spills

Mercury – Clean up with pre-purchased spill clean up kit. Collect Hg in a sealed container to prevent exposure to Hg vapors. Large spills or spills that render some Hg unavailable for clean up (e.g. Hg in floor cracks or beneath lab benches), an airborne evaluation of Hg vapor content may be required.

E. Compressed gas cylinders

Compressed gas cylinders used in the laboratories will be properly secured with a metal collar or chain or within an approved compressed gas cylinder cart.

F. Incident Report

An incident investigation should take place after each spill and/or accident. The Incident report should be completed by the supervisor/instructor and forwarded to the Principal, Chemical Hygiene Committee, and District Safety Committee.

X. REVIEW AND UPDATE

This Chemical Hygiene Plan will be reviewed and updated annually.

Suggested Chemical Storage Pattern

Storage of laboratory chemicals presents an ongoing safety hazard for school science depts. Many chemicals are incompatible with each other. The common method of storing these products in alphabetical order sometimes results in incompatible shelved materials. For example, storing strong oxidizing materials next to organic chemicals can present a hazard.

A possible solution is to separate chemicals into their organic and inorganic families and then to further divide the materials into related and compatible families. The following page provides this family arrangement pictured as shelf area in the chemical storage area.

INORGANIC	ORGANIC
1. Metals, Hydrides	1. Acids, Anhydrides, Peracids
2. Acetates, Halides, Iodides, Sulfates, Sulfites, Halogens, Thiosulfates, Phosphates	2. Alcohols, Glycols, Amines, Amides, Imines, Imides
3. Amides, Nitrates (except Ammonium Nitrate), Nitrites, Azides	3. Hydrocarbons, Esters, Aldehydes
4. Hydroxides, Oxides, Silicates, Carbonates, Carbon	4. Esters, Ketones, Ketenes, Halogenated Hydrocarbons, Ethylene Oxide
5. Sulfides, Selenides, Phosphides, Carbides, Nitrides	5. Epoxy Compounds, Isocyanates
6. Bromates, Perchlorates, Perchloric Acid, Chlorites, Hypochlorites, Peroxides, Hydrogen Peroxide	6. Peroxides, Hydroperoxides, Azides
7. Arsenates, Cyanides, Cyanates	7. Sulfides, Polysulfides, Sulfoxides, Nitriles
8. Borates, Chromates, Manganates, Permanganates	8. Phenols, Cresols
9. Acids (except Nitric) *Nitric Acid is isolated and stored by itself	
10. Sulfur, Phosphorus, Arsenic, Phosphorous Pentoxide	

Additional Storage Suggestions

1. Store acids in dedicated acid cabinet(s). Store Nitric Acid in that same cabinet ONLY if isolated from other acids. Store both inorganic and some organic acids in the acid cabinet.
2. Store flammables in a dedicated flammables cabinet.
3. Ideally, shelving assemblies would be of wood construction.
4. Avoid metal, adjustable shelf supports and clips. Better fixed, wooden supports.
5. Avoid floor chemical storage (even temporary).

Suggested Shelf Storage Pattern – Inorganic

INORGANIC #10	INORGANIC #7
INORGANIC#2	INORGANIC #5
INORGANIC #3	INORGANIC #8
INORGANIC #1	INORGANIC #6
INORGANIC #4	MISCELLANEOUS

Suggested Shelf Storage Pattern – Organic

ORGANIC #2	ORGANIC #8
ORGANIC #3	ORGANIC #6
ORGANIC #4	ORGANIC #1
ORGANIC #5	MISCELLANEOUS
ORGANIC #7	MISCELLANEOUS