# Chemical Hygiene Plan

for the

Vegetable Crop Research Unit (VCRU)
Research Laboratories
USDA-ARS
Madison, WI

based primarily on OSHA standards 29 CFR 1910.1450 (Appendix A)

LAST PLAN UPDATE: July 27, 2016
When updating this plan, use the most recent Microsoft Word version on AFS at
U:\simonlabweb\procedures\safety\Chemical_Hygiene_Plan_VCRU.doc

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I. Purpose

The general intent of the chemical hygiene plan is:

1. to protect employees from health hazards associated with the use of hazardous chemicals, and

2. to assure that employees are not exposed to substances in excess of the permissible exposure limits set forth by the Occupational Health and Safety Administration (OSHA) in 29 CFR 1910 Subpart Z.

All employees will review the plan, and a copy will be located in each laboratory. After reading the plan all employees (state, federal or other) will sign and date the cover page.

The plan will be reviewed and updated annually by the Madison Location Safety, Health, and Environmental Management (SHEM) Committee's Chemical Hygiene Subcommittee. The updated plan will be reviewed and the cover sheet signed by all employees or as necessary by new employees.

II. Responsibilities under the Chemical Hygiene Plan

A. The Madison Location Safety, Health, and Environmental Management (SHEM) Committee will:

1. Update the Chemical Hygiene Plan annually.

2. Provide information and guidance to employees regarding chemical storage, use, and disposal.

3. Inform the Research Leader of changes in governmental regulations pertaining to chemical storage, use and disposal.

B. Scientists will be responsible for implementing required regulations in the laboratories, based on information provided by the SHEM committee.

III. Employee Information and Training

A. COVERAGE All persons **working** or **volunteering** in USDA-ARS **labs** are covered under the Chemical Hygiene Plan (CHP). This includes federal employees, state employees, hourlies, graduate students, post-docs, and visiting scientists.

B. The laboratory scientist has the primary responsibility to train their employees and make sure safety standards and procedures are followed in the laboratory. At a minimum, everyone shall receive initial orientation and annual refresher training on safety.

C. Each person covered by the laboratory standard will be provided with information and training to apprise them of the hazards associated with the chemicals present in their work area. The immediate supervisor will conduct this training at the time of initial assignment and prior to new assignments involving different exposure situations. (Employee Orientation, Appendix C).

D. The training and information sessions will include:

1. Initial and periodic training

    a. the location and availability of the Chemical Hygiene Plan. The cover sheet will be signed and dated after the plan has been read.

    b. the contents of OSHA standard 1910.1450 and its appendices. These are available to employees as part of the Chemical Hygiene Plan (Appendix A).

    c. information on OSHA permissible exposure limits (PEL's) where they exist, and other recommended exposure limits (see Chemical Hygiene Officer for OSHA Z-List).

    d. location of reference materials and MSDS's (maintained in each laboratory).

    e. an annual safety orientation conducted by the UW Safety Office and/or the USDA-ARS.

2. Continuous (ongoing) training

    a. the physical and health hazards of chemicals in laboratory work areas.

    b. methods to detect the presence or release of chemicals (e.g., odor thresholds, or periodic monitoring where warranted).

    c. measures to protect employees from chemical hazards, including: standard operating policies and procedures, work practices, emergency procedures, personal protective equipment and apparel, and details of the Chemical Hygiene Plan.

E. Each employee will sign a form documenting that they have received training (Appendix C).

F. Each scientist is responsible for developing standard operating procedures for specific operations in his/her laboratory not covered in other safety training sessions.

G. Exclusions and other safety training requirements

1. Persons working in a GREENHOUSE, potentially exposed to pesticides, must receive Worker Protection Standard training at orientation and at 5-year intervals or earlier if there are significant changes to the greenhouse operation.

2. Persons working in a GREENHOUSE or in the FIELD applying restricted pesticides must be certified and licensed by the Wisconsin Department of Agriculture, Trade and Consumer Protection.

3. Persons working in the ENGINEERING LAB (at Dairy Forage Research Center) shall receive training and annual updates specific to that area. Record of this training will be kept by the supervisor and technician in charge of the engineering lab.

4. Persons working in the GRINDING ROOM (at Dairy Forage Research Center) shall receive supervisor led training. Record of this training will be kept by the supervisor and the technician in charge of the grinding room. Periodic emails will be sent out with the status and information about the grinding room.

5. Clerical staff who have incidental laboratory contact shall be trained on emergency procedures that are generalized for everyone, such as fire, tornado, power failure, snow emergency, chemical spill, radiation awareness, workplace violence, etc. The Research Leader shall be responsible for training clerical staff.

## IV. Maintenance of Protective Equipment

A. The performance of chemical fume hoods will be measured annually by the UW Safety Department, and the results of the inspection of each hood will be posted prominently on the outside of the hood. Reports of hood inspections are filed with the UW Safety Department.

B. The UW Safety Department will inspect the safety showers and eyewash stations annually. Individual labs are responsible for monthly inspections of their safety showers and eyewash stations with any problems reported to the Building Operations Supervisor for repair.

C. Protective apparel (e.g. gloves, safety glasses, etc.) will be inspected prior to use and replaced if its function is impaired.

D. Fire extinguishers will be inspected annually by the UW Safety Department. In addition, individual labs will conduct monthly inspections to ensure the lockseal is intact and the hose is not blocked, reporting to the Building Operations Supervisor for replacement if necessary.

E. General inspections of laboratory facilities should be performed semi-annually. For labs in UW facilities, the UW Safety Department performs these annually as does the Location SHEM committee. Laboratory staff will perform informal inspections on a continual basis.

V. Medical Consultation and Examination

The USDA-ARS will provide to affected employees, medical attention through one of two programs: the Workers Compensation Program (for immediate attention) or through the Occupational Medical Surveillance Program (OMSP) (annual monitoring).

A. Office of Workers' Compensation Program (OWCP)

It is REE policy that necessary steps are taken to make the workplace safe and productive, and, when injuries do occur, employees are given the best possible care and are returned to work as quickly as possible.

The Federal Employees' Compensation Act (FECA) provides compensation benefits to civilian employees of the United States for disability (temporary or permanent) due to personal injury or illness sustained while in the performance of duty. The Act also provides for compensation for employment-related disease. Benefits available to injured employees include wage replacement benefits, medical treatment and vocational rehabilitation. FECA also provides compensation to dependents if the injury or disease causes the employee's death. FECA is administered by the Office of Workers' Compensation Programs (OWCP), U.S. Department of Labor.

There are two classification types that relate to workers' compensation: "Traumatic Injuries" and "Occupational Disease".

1. Traumatic Injuries: Classified by being caused by a single event and occurring during a single shift (i.e.: accident such as a cut due to broken glass). If such an event occurs, it usually requires "immediate" action. The following protocol should be observed:
    a. Immediately notify your supervisor of the incident.
    b. Provide first aid for any life-threatening condition.
    c. Seek medical attention as necessary. If time allows, take CA-20 (Attending Physician's Report) Form along and provide to medical provider along with MSDS information, if chemical involved.
    d. Notify the Administrative Office at 890-0101 within 24 hrs of the incident to complete appropriate paperwork including, but not limited to, CA-1, CA-20 and Location Accident/Incident Report.
2. Occupational Disease: Classified by being caused by multiple events and usually occurring over more than one shift. This would include if an employee develops signs or symptoms of exposure to chemicals with which they have worked with over a period of time or in the event that an incident takes place in the work area (spill, leak, explosion or other accident) which presents the likelihood of an exposure in excess of the Permissable Exposure Level (PEL) or Threshold Limit Value (TLV). The following protocol should be observed.
    a. Notify your immediate supervisor and contact the Location Administrative Office at 608/890-0101.
    b. Coordinate with the Location Administrative Office contact with the third party Local Provider.

c. Provide to the third party Local Provider the Laboratory Chemical Emergency Data Sheet (Appendix B), the CA-2 and CA-16 form and ARS-182 A/B/C forms.
d. Completion of the Location's Accident/Incident Report.
e. Return CA-2 and CA-16 forms following Local Provider appointment to the Administrative Office for submission to the Office of Workers' Compensation Program.

It is important to remember that the Office of Workers' Compensation Program has specified timelines in which applications for payment must be submitted. Failure to timely submit required information may lead to denial of claim. Contact the Administrative Office at 608/890-0101 for more information.

B. Occupational Medical Surveillance Program (OMSP)

The OMSP is designed for the detection of **occupationally significant medical anomalies**. The limited medical procedures performed are not intended, and should not be construed, to substitute for the care provided by the employee's personal physician.

The OMSP examines authorized employees to establish health-status baselines and detect work-related changes in health status. Medical records will document procedures performed, establish baselines, and work-related physiological changes (if any) throughout the employee's career. This information will be used to establish trends and to determine unusual susceptibility to illness from exposures in the work environment, permit identification of harmful effects of agents used, and provide medical treatment and advice.

Participation in the OMSP is voluntary. Medical evaluations required by OSHA regulations may be performed in conjunction with the OMSP, however, the OMSP should not be confused with OSHA requirements. The OMSP is a voluntary, broad-based medical surveillance program, and its purpose is to identify exposures to potentially harmful agents and aid in the early detection of adverse health effects, if any. OSHA-mandated medical evaluations are limited and specific to the hazard of work activity in question.

Employees meeting the following criteria may participate in the OMSP:

- Those who work with, or are potentially exposed to, chemical, biological, and/or physical hazards that could cause adverse health effects, e.g., pesticide applicators, animal caretakers, and maintenance workers.

- Those who are identified by their supervisor based on his/her assessment of the work environment.

According to OSHA regulations, ARS is required to perform medical monitoring of employees meeting the following criteria:

- Those who are required to wear respiratory protection.

- Those who are required to be in a Hearing Conservation Program.
- Those who apply pesticides labeled Danger or Warning (Toxicity Category 1 and 2).
- Those who are required to be in the Bloodborne Pathogen Program.
- Those who work with chemical and/or physical hazards, where their work
  - environment is at or above the Action Level, e.g., one-half the Permissable Exposure
  - Level (PEL) or Threshold Limit Value (TLV).

On an annual basis, employees will be offered the opportunity to participate in the OMSP. The Administrative Office for the Madison location will coordinate with employees desiring to participate in the OMSP with the designated third party provider. Employees electing to participate will complete the ARS-182 A/B/C forms (as applicable). These forms will then be forwarded to the Location's third party Local Provider.

The Local Provider will contact the employees and set up appointments and arrange for the appropriate testing based on the occupational exposure. This information is then relayed to the U.S. Department of Health and Human Services, Federal Occupational Health Service (FOHS) for review. Based upon the information and test results provided by the Local Provider, the FOHS Medical Physician will issue a letter of "Occupational Medical Findings".

The "Occupational Medical Findings" letter is sent to the Location's Administrative Office and will identify the tests performed, occupational findings, and recommendations for additional tests (if necessary). A separate letter is sent directly to the employee informing him/her of specific results. Due to privacy regulations, detailed and specific results are only sent directly to the employee. The letter received by the Administrative Office only includes whether an occupational exposure exists or not and what follow-up action is necessary.

Information obtained from employee participation in the OMSP will be kept as part of the employee's 30-year OSHA file.

VI. Avoidance of routine exposure

Proper preparation is essential to minimizing exposure to hazardous chemicals used in the laboratory. Prior to the initiation of a new experiment or when changes are made to routine procedures, the employee must do the following:

- ✓ Consult available Material Safety Data Sheets (MSDS) to determine the hazards of each chemical and the signs and symptoms of exposure
- ✓ Realize the hazards associated with the procedure and with any products of the operation

- Because almost all chemicals have at least some hazards, it is desirable to minimize chemical exposures to the extent possible within the context of the research activity. It is best to avoid the underestimation of risk and to assume that all substances of unknown toxicity are toxic.
- Avoid skin contact at all times.
- Do not taste chemicals. Smell chemicals only when absolutely necessary, by wafting vapors toward the nose with the hand.

✓ Insure that the operation will be performed in an appropriately ventilated area (e.g., chemical fume hood) to minimize exposure to the hazardous chemicals

- Handling of volatile, toxic, or malodorous chemicals must be performed in a chemical fume hood.
- Release of hazardous chemicals is not permitted in confined areas or areas having poor ventilation. Operations, which may discharge hazardous chemicals, must be performed in a chemical fume hood, or in experimental apparatus in which hazardous chemical vapors are trapped for subsequent disposal.

✓ Assemble and check personal protective equipment

- Personal protective apparel appropriate for the required degree of protection will be worn.
- The scientist or technician will train employees on the use, maintenance and storage of protective equipment. If respirators are required, users must have separate training.
- A glove chemical resistance chart is provided in Appendix E.
- The form "OSHA PPE Standard 29 CFR 1910.132-138" (Appendix A) must be filled out completely. A copy will be posted in the laboratory and the original kept with the Chemical Hygiene Plan.

✓ Know the location and operation of ancillary safety and emergency equipment (fire extinguisher, safety shower, eyewash station, first aid kit, etc.)

- The supervising scientist or technician will instruct employees on the location and use of safety showers and eyewash stations.
- Fire extinguisher training will be conducted on a biannual basis at the location.

✓ insure that methods and needed supplies are available to dispose of hazardous chemical residues, including both excess reactants and any unneeded products

✓ inform the other lab personnel regarding the operation, the nature of the hazard, and the safety precautions to be undertaken.

## VII. Particularly Hazardous Substances

Use of chemicals as defined below which present a serious chemical hazard will require prior **approval** by the Research Leader when used above threshold levels. Prior approval is not required for work conducted in a fume hood and for amounts not exceeding 5 grams of solid or 100ml of liquid per experiment. Even if prior approval is not required high hazard procedures should be thought out and a safety plan in place. Chemical reactions that are safe on one scale may require extra precautions when scaled up.

These procedures include: (as defined by 29 CFR 1910.1450)

A. Work with select carcinogens (if on the IARC, OSHA, or NTP list)

B. Work with reproductive toxins -- mutagens, teratogens, embryotoxins (see Chapter 2 of the UW Laboratory Safety Guide).

C. Work with acutely hazardous chemicals where there is the possibility of exposure to an acutely toxic dose. (orally administered $LD_{50} \leq 50$ mg/kg; skin absorption $LD_{50} \leq 200$ mg/kg; or airborne $LC \leq 200$ ppm or 2 mg/L (see Chapter 2 of the UW Laboratory Safety Guide).

In the above cases, the scientist wishing to use these materials (Appendix D for a list of substances and approval form) must complete the Particularly Hazardous Substance Use Approval Form, which provides documentation of the specific standard operating procedure for use of the substance including the nature of the hazard, the amounts to be used, and the precautions taken to minimize the exposure of employees. Submit the completed form to the Research Leader, and Principal Investigator for approval. The SHEM Committee will review the request and forward its recommendation to the Research Leader for approval. Approved Particularly Hazardous Substance Forms should be kept on record in the Chemical Hygiene Plan and a sign must be posted listing the hood, benchtop, or storage area as a designated area for particularly hazardous substances.

## VIII. Emergency Response

- The Emergency Action Plan (under OSHA standard 1910.38) and the Emergency Response Plan under OSHA standard 1910.120(p) are included in the UW Emergency Action/Response Plans on file with Dane County Emergency Planning Board.

- The Evacuation Plans for each unit (Fire & Tornado) are included in Appendix B of this Plan.

- Laboratory Emergency Information Sheets are posted on the outside of each laboratory door to facilitate a prompt emergency response. This form lists the contact information and bio, chemical and radiation hazards for your laboratory, updated annually.

A. Accidents

In the event of a minor accident, the person will seek immediate care and clean-up as necessary. An Incident/Accident Report will be filled out within 24 hours and turned in to his/her immediate supervisor and faxed to the LAO.

**Chemical splash on the body:** Immediately rinse the affected area in the nearest emergency shower or other water source for at least 15 minutes. While showering, remove all contaminated clothing, including undergarments and jewelry. Removing saturated clothing from the victim promptly can greatly reduce the severity of a chemical burn.
**Chemical splash in the eye:** Immediately flush the opened eyes for 15 minutes in an emergency eyewash. If contact lenses are present, remove contacts while flushing the eye. Remember, time is crucial.
**Smoke or other gaseous inhalation:** Move the victim to an area of fresh air, resuscitate with rescue breathing if necessary, and give shock prevention treatment (victim lying down, lightly covered to preserve body heat and comforted to reduce anxiety.)
**Poison:** Call the UW Hospital Poison Control Center (608/262-3702) for advice about poisoning and chemical toxicity. Alternatively call the national number, 1-800-222-1222, which will connect you with your local poison control center. The MSDS and chemical label will be necessary for definitive treatment.
**Thermal Burn:** Immerse the burned area in cold water or hold under cold running water until the pain stops. Cover with a sterile dressing.
**Injured and Bleeding:** Hold a clean pad directly on the wound and apply hand pressure. If necessary, elevate the bleeding extremity and apply pressure to a pressure point to reduce blood flow.
**Clothing Fires:** Put out burning clothing or hair by dousing the victim in a safety shower or other water source, or by smothering the fire with a cotton lab coat or fire blanket. If these resources are not available, make the victim roll on the ground to put out the flames.

B. Small chemical spills

Each work site should have appropriate amounts of absorber (e.g., Floor-dry, sand, vermiculite, etc.) and spill pillows to rapidly clean a spill as well as containers (e.g., 5-gallon pails) in which to place the material.

In the event of a small spill (under 5 liters), the person responsible for the spill will be responsible for its cleanup. An Incident/Accident Report will be filled out within 24 hours and turned in to his/her immediate supervisor and faxed to the LAO.

Always wear appropriate protective clothing and clean up a small spill as follows:

1. Sprinkle spill control materials over the entire spill area. Circle the spill working the absorber from the outside to the inside of the spill. This reduces the chance of splash or spreading the spilled material.

2. Use care if your spill is acidic. Many spill pillows do not work with hydrofluoric acid. Many neutralizers for acids or bases have a color change indicator to show when neutralization is complete. Read the instructions first.
3. When spilled materials have been absorbed, use a brush and scoop to place the materials in an appropriate container (e.g., polyethylene bag, 5-gallon pail, etc.).
4. Decontaminate the surface where the spill occurred with mild detergent and water Call the Safety Department to notify them of the spill and to remove your waste.

C. Large chemical spills / Major Emergencies

- In the event of a major hazardous chemical spill or accident, the person responsible will warn personnel in the immediate area to evacuate (see Appendix B for details of the evacuation procedure), evacuate themselves and then call 9-911 and report the incident to the University Dispatcher. The responsible person will also notify his/her immediate supervisor and the Location Administrative Officer.

- For those spills that threaten fire, explosion, or hazardous vapors, the person responsible will pull the fire alarm and warn personnel in the immediate area to evacuate.

- Except for the purpose of saving the life of personnel unable to evacuate the building, the evacuated area will not be re-entered until the extent of the hazard has been determined. The decision to re-enter the building will be made by the Research Leader upon consultation with emergency personnel in charge at the time.

## IX. Standard Operating Policies

The following standard operating policies will be followed in the laboratory:

A. Planning

Appropriate planning of experiments must be conducted with an eye toward reducing the amount of exposure, and the mitigating consequences of an exposure resulting from spills or other accidents. In addition, appropriate planning assists in meeting the Location's Environmental Management System Objectives of reducing chemical usage and replacement of old technologies/methodologies.

1. Where choices are available, the least hazardous and smallest amount of chemical necessary for the operation should be selected.
2. The chemical selected must be appropriate for the ventilation capability of the work area.
3. Coordination with other labs to purchase chemicals used in small quantities, only infrequently, and for which there is a limited shelf life helps to reduce cost and waste.

B. Food, beverages and smoking

1. Food and beverages are not permitted in the laboratories. Food and beverages stored under refrigeration must be stored only in refrigerators designated for such purposes, and must not be stored with laboratory chemicals.

2. Smoking is not permitted in the any UW building, any ARS owned building, or in federally owned vehicles.

C. Signs and Labels

Prominent signs and labels of the following types must be posted:

a. Emergency telephone numbers of emergency personnel/facilities, supervisors, and laboratory workers.
b. Identity labels, showing contents of containers (including waste receptacles) and associated hazards.
c. Location signs for safety showers, eyewash stations, other safety and first aid equipment, exits and areas where food and beverage consumption and storage are and are not permitted.
d. Warnings at areas or equipment where special or unusual hazards exist.

D. Equipment and glassware

1. Equipment and labware must be compatible with the chemical agent.

2. Glassware must be checked for cracks or other damage. Glassware may be repaired if possible, but if it is damaged beyond repair then the glassware must be disposed of in clearly marked, puncture-resistant containers and placed next to the trash for pickup.

3. Vacuum and high-pressure applications: unless the glassware is specifically designed for vacuum or high-pressure applications, it must be wrapped in tape or plastic mesh to reduce the hazards associated with explosion or implosion. Dewar flasks also must be so protected.

4. Sharps (hypodermic needles, razor blades, etc.) must be shielded when not in use. Sharps and potential sharps (Pasteur pipettes, glass pipettes, slides, cover slips, pipette tips, other plastics considered sharps etc.) must be disposed of in clearly labeled containers designed to resist puncture (Appendix E, for the UW Guidelines).

E. Exiting the laboratory

1. To minimize problems with evacuation, laboratory exits must not be blocked with equipment or other items.

2. For proper operation of the building laboratory ventilation system, all laboratory doors must be closed.

3. Employees handling hazardous chemicals must remove gloves and contaminated protective apparel prior to leaving the laboratory.

F. Conduct

All employees will conduct themselves in a responsible manner at all times.

G. Dispensing of chemicals

1. Volatile and toxic materials must be handled in a chemical fume hood and proper PPE will be used.

2. Pipetting or siphoning must be done with mechanical suction devices (e.g., rubber bulbs, electronic pipetters, etc.). Mouth pipetting is prohibited.

3. Pipettes may be disposed of only after appropriate decontamination.

H. Personal apparel

1. Personal apparel must be appropriate for a chemical laboratory.

2. Shoes must provide complete foot coverage (no open-toed shoes permitted).

3. Shorts may be worn only with approval of the immediate supervisor.

4. Contacts should not be worn when working with any corrosive chemicals.

I. Personal protective equipment and clothing

1. Safety glasses are required at all times while working in the laboratory and will be provided to employees.

    a. Goggles or safety glasses should be worn over prescription glasses that do not meet the requirements for safety glasses.
    b. Prescription glasses that meet safety glasses requirements will be constructed with safety glass and have side shields.
    c. When operations present a splash or projectile hazard, a face shield will be used in conjunction with safety glasses.

2. Gloves will be worn when dispensing or handling all toxic or corrosive chemicals. The glove material must provide resistance to the chemical in question. Gloves will be changed frequently or removed when answering the phone, exiting the laboratory, etc. Hand washing after handling chemicals is required. (See Appendix E for glove chemical compatibility tables).

3. Lab coats will be provided to all employees working in the laboratory and will be worn at all times.

4. OSHA approved dust masks will be worn when necessary to reduce inhalation of particulate material (e.g. grinding solids). Respirators will be used in accordance with OSHA standard 29 CFR 1910.134.

J. Unattended operations

1. Any unattended operations involving hazardous chemicals must be adequately lighted, and signed with the identity of the chemical and the phone number of the person to contact in case of a spill or accident.

2. Automatic shutoff devices (incorporating level detectors, temperature sensors, etc.) will be incorporated into the experimental setup, for activation in the event of a spill or accident.

3. Experimental setups must provide for complete retention of hazardous chemicals in the event of a spill or accident.

4. Distillations shall not be permitted to run unattended, except for that of distilled water in a commercial still with safety shut offs.

K. Ventilation equipment

1. Proper ventilation is required for work with hazardous chemicals. Such devices (e.g., chemical fume hoods) must be checked at each use, and their performance measured annually.

2. Ventilated enclosures will be sufficiently free of excess chemicals or equipment that would block vents or cause additional hazards.

3. Work inside chemical fume hoods will be performed to minimize escape of hazardous materials from the hoods (e.g., work done 6" behind the airfoil and the sash at a height of 18" or less). To reduce energy costs, shields will be closed when not in use.

L. Vigilance

The employee must be alert to unsafe conditions, which would increase the potential for an accident involving hazardous chemicals. Such conditions will be corrected immediately.

M. Waste disposal and storage

In accordance with location policies for pollution reduction, employees will make full effort to adopt procedures that reduce pollution and waste by recycling, reducing use of chemicals and other materials, using biofuels in lieu of petroleum-based fuels, adopting "green" protocols, etc. These management changes will be documented on an annual basis by the Location Administrative Office.

1. Hazardous chemical wastes must be disposed of in accordance with the UW Laboratory Safety Guide (see Chapter 7).

    a. In-lab Chemical Management (i.e. solvent, commingling, flushing down the sanitary sewer, and neutralization)

    b. On-Site Hazardous Materials Management (Contact Safety 608/262-8769)
        - Free mercury thermometer exchange service
        - Organic Solvent carboys picked up and delivered Tuesdays.
        - Surplus Chemical Pickup

2. Before the employment of a principal investigator, post-doctorate scientist, visiting scientist or graduate student ends, chemicals for which they were responsible for must be inventoried and shared among other project leaders, put on surplus or disposed of appropriately.

3. Chemical Storage

    Chemicals must be stored in labeled containers (OSHA HAZCOM Guidelines – Appendix E). If reagent bottles are reused to store chemicals different from the bottle's original contents, the label must be removed or defaced. New labels must be made for the bottles, which meet HAZCOM guidelines. Chemicals must be stored in such a manner as to minimize exposure to personnel.

    a. Hazardous liquid chemicals must be stored in chemically resistant secondary containers of sufficient volume to contain the entire contents of the bottle in the event of a spill.
    b. Incompatible chemicals must not be stored together (see guidelines in UW Safety, Appendix F).
    c. Volatile or flammable chemicals must be stored in vented (if available) flammable storage cabinets. NFPA 30 and 45 prescribe requirements for storage and container size. NFPA 30-1993 chapter 4-5.5.3 allows storage of up to 10 gallons of flammable liquid in containers of 1 gallon or less to be stored outside of flammable liquid storage cabinets. Good safety practice would insist that flammable liquids be put away when not in use.

4. The Chemical Inventory

   Each laboratory must maintain a database listing chemicals maintained in the laboratory. The Chemical Inventory must be updated annually and a copy given to the Location Administrative Officer on both diskette and hard copy. (Appendix G)

5. MSDS Sheets

   A MSDS sheet must be maintained for each chemical stored. The chemical supplier should provide you with one upon request, and they can also be found online.

N. Working alone

Working alone with toxic chemicals is prohibited unless steps are taken to insure that security personnel and/or coworkers periodically check on the employee.

O. Specific classes of hazards and hazardous chemicals:

1. Corrosive agents. Employees must handle corrosive reagents only with proper protective equipment (gloves, lab coats, faceshield, etc.). Spills must be cleaned up immediately and the cleanup materials packaged (see UW Safety and Disposal Guide) to prevent exposure to personnel (including custodial crews) and facilities. Volatile corrosive agents should not be stored in cabinets constructed of nonresistant materials

2. Electrical equipment. Electrical equipment must be sufficiently grounded if operated in an environment containing flammable vapors.

3. Cryogenic procedures. Cold materials must be kept in compatible containers during use. Insulated gloves must be worn when handling dry ice. Insulated gloves and a face shield must be worn when handling liquid nitrogen or liquid helium.

4. Pressurized and vacuum operations. Vessels used for pressure and vacuum applications must be designed for use at non-ambient pressures, or must be shielded to minimize breakage and projectile hazard. Vacuum pumps must be fitted with traps and/or smoke arresters to collect oil, chemical vapors, etc.

5. Compressed gases. Compressed gases must be clearly labeled and secured at all times via chains, straps, or stands. Gas regulators and downstream piping must be resistant to the gas in question. Gas regulators must be shut off when not in use; shutoff at both the regulator needle valve and the cylinder tank valve is recommended. Toxic compressed gases must be vented into chemical fume hoods during storage and use.

P. Radiological safety

All employees who work in a building where radioisotopes are used must complete an online USDA Radiation Awareness training.

The procedures for the storage, handling, and disposal of radioisotopes, mandated by the US Nuclear Regulatory Commission, are summarized in the UW Radiological Safety Manual.

Q. Biological safety

The procedures for the storage, handling, and disposal of biological agents are summarized in the UW Biological Safety Manual.

# Appendices

Appendix A - Standards

1. OSHA standards 29 CFR 1910.1450
2. OSHA PPE Standard 29 CFR 1910.132-138

Appendix B - Forms

1. Forms CA-1, CA-2, CA-16, and CA-20 are available on the Federal Employees' Compensation Act (FECA) Forms page at http://www.usda.gov/da/shmd/owcpforms2.htm
2. ARS-182 A/B/C
3. Fire and Tornado Procedures (A Word version is avaliable [here] for customization)
4. Horticulture building floor plans

Appendix C - Training

Employee Orientation — Employee orientation forms are lab-specific and maintained by individual labs. Those labs that have chosen to make theirs available on a web page are:

a. Simon

Appendix D - Hazards

1. Particularly Hazardous Substances
2. Particularly Hazardous Substance Use Approval Form

Appendix E – More Forms

1. Organic Solvent carboys
2. OSHA HAZCOM Guidelines
3. Glove chemical resistance chart
4. Sharp and Laboratory Glass Disposal

Appendix F – UW Safety

The University of Wisconsin Chemical Safety and Disposal Guide is at http://www2.fpm.wisc.edu/chemsafety/GUIDE2005/table_of_contents2005.htm

Appendix G - Resources

1. Safety Websites
   a. OSHA: http://osha.gov/
   b. UW-Madison Safety: http://www.fpm.wisc.edu/safety/
   c. UW-System Safety: http://www.uwsa.edu/oslp/safety/
   d. MWA SHEM: http://www.mwa.ars.usda.gov/mwa/shem/shem.html
   e. Location SHEM: http://ars.usda.gov/services/docs.htm?docid=4811
   f. Vegetable Crops Research Unit safety page: http://www.ars.usda.gov/Services/docs.htm?docid=4998
   f. Manual 230 - ARS Safety, Health, and Environmental Management Program http://www.ars.usda.gov/afm2/ppweb/230-0m.htm
2. Chemical Inventory