



12/10/10

UNIVERSITY OF WASHINGTON CHEMICAL HAZARD COMMUNICATION (HAZCOM) PROGRAM

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1. UW HAZCOM PROGRAM SCOPE

Major HazCom Components

The Chemical Hazard Communication (HazCom) program is mandated by various laws that provide for workers to be informed of their chemical hazards. The University of Washington program complies with this mandate in Administrative Policy Statement (APS) 12.5, Chemical Hazard Communication Program and this guidance manual, also available as web pages at <http://www.ehs.washington.edu/ohshazcom/index.shtm> . The main components of the program which need to be implemented per the APS and this guidance document are:

- Identifying hazardous chemicals and maintaining a list in the UW MyChem database system,
- Making use of Material Safety Data Sheets / Safety Data Sheets (MSDSs/SDSs) and labels to provide hazard information,
- Informing and training employees as to work task chemical hazards and the precautions for working with chemicals in a safe manner, and
- Maintaining documentation.

This document is the official written UW HazCom program. If you change these instructions, the changes need to be coordinated with and approved by Environmental Health and Safety (EH&S, 206-543-7388, uwcho@uw.edu). Refer to the following sections for specific details:

Guidelines

Section 2. UW HazCom Responsibilities describes compliance with the UW HazCom program, by work area directors / managers / supervisors / employees, by EH&S, and by the UW Chemical Hazards Advisory Committee. This section assigns the different program areas to the members of the UW community in order to achieve an effective HazCom program. A compliance checklist is also available at Appendix A – HazCom Compliance Checklist.

Section 3. Identifying Hazardous Chemicals defines which chemicals and processes need to be included by work area supervisors in the HazCom program.

Section 4. Tracking Hazardous Chemicals gives advice as to adding chemicals to the work area's MyChem inventory, or instructions if a work area tracks chemicals through a different process.

Section 5. Handling Material Safety Data Sheets (MSDSs) / Safety Data Sheets (SDSs) provides options for making MSDSs and SDSs available to your workers and provides other information about optimizing the use of MSDSs / SDSs at the UW.

Section 6. Container Labeling provides guidance for labeling the variety of hazardous chemicals found throughout the university including unusual or difficult-to-label situations.

Section 7. Documenting Safe Procedures provides guidance for assessing chemical hazards in a variety of work situations, and for documenting the safety requirements.

Section 8. HazCom Training describes the chemical safety training that must be done and provides advice for documenting that training. It includes information about training if you receive containers labeled per the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

If you ship chemicals to non-UW recipients, Section 9. Providing an MSDS/SDS and Label for a UW-Synthesized Chemical provides advice for generating an MSDS (or SDS) and label.

If you have dealings with contractors, Section 10. HazCom Involving Contractors provides important information for ensuring communications are appropriate.

Section 11. HazCom Regulatory Information provides some background information about regulations affecting the UW HazCom program and UW compliance.

Please refer any questions about implementing the HazCom program to EH&S at 206-543-7388 or ehsdept@uw.edu .

2. UW HAZCOM RESPONSIBILITIES

Work Unit Responsibilities. Departments and or Operational Units must either follow the compliance procedures in this guidance manual, or document their methods for meeting the requirements of the Chemical Hazard Communication (HazCom) Program and have them approved by EH&S (206-543-7388, uwcho@uw.edu). Responsible individuals through first-level supervisors in department and operational units are responsible for implementing the following activities within their unit:

- Identifying hazardous chemicals
- Maintaining the chemical inventory in MyChem
- Ensuring personnel have access to Material Safety Data Sheets (MSDSs)
- Sending EH&S copies of any new MSDSs received
- Ensuring containers are labeled
- Informing employees of piping and tubing contents
- Documenting safe procedures for handling chemicals
- Assessing new and unusual tasks
- Informing employees about the HazCom program
- Providing work-specific training about safety requirements
- Ensuring personnel complete annual asbestos awareness training and reminding personnel annually about program records
- Maintaining training records
- Including consumer chemicals in the HazCom program if their use is intensive
- Generating MSDSs and labels on chemicals synthesized and provided to others
- Informing contractors of potential chemical exposures they may receive from UW activities
- Obtaining information from contractors when their use of hazardous chemicals can impact UW employees

The following paragraphs provide additional details about those responsibilities. In order to keep all the details straight, you should print out and refer to a checklist (Appendix A) which is also available here: [HazCom_Compliance_Checklist.doc](#).

You must identify hazardous chemicals or processes which may result in exposure to your employees, students, or collaborators working at UW sites, i.e., those for whom you have a safety responsibility. Methods for doing this are described in Section 3. Identifying Hazardous Chemicals.

You must arrange to enter chemical inventories into the University's MyChem database. This could be done by either directly inputting information into the MyChem system or alternatively by maintaining inventories in a departmental spreadsheet or database that is formatted in such a way that it can be easily downloaded periodically into the MyChem database. MyChem requirements are described in Section 4. Tracking Hazardous Chemicals.

You must ensure all employees have access to the MSDS for each hazardous chemical they may use. You can use electronic copies of MSDSs or paper copies of MSDSs. Methods are described in Section 5. Handling Material Safety Data Sheets (MSDSs) / Safety Data Sheets (SDSs). It is

important that employees can access the MSDSs at all times while working with chemicals – the computer terminal or MSDS file cannot be locked up in someone’s office unless everyone has a key.

You must send a paper or electronic copy to EH&S of any MSDS received by the unit that is not already in the MyChem MSDS system. Methods are described in Section 5. Handling Material Safety Data Sheets (MSDSs) / Safety Data Sheets (SDSs).

You must ensure all containers are properly labeled. Methods are described in Section 6. Container Labeling.

You must ensure employees are informed of the contents of un-labeled pipes in the work area. Long runs of tubing where the source of the gas or fluid cannot be seen from the point of use should be labeled as to the contents. Methods for all types of labeling are described in Section 6. Container Labeling.

You must assess and document procedures for the safe use of hazardous chemicals in the workplace. Methods are described in Section 7. Documenting Safe Procedures. In general:

- In chemical laboratories, ensure that Standard Operating Procedures (SOPs) are written, which include requirements for the safe use of hazardous chemicals, and are placed in the laboratory’s Chemical Hygiene Plan (CHP). (See the [UW Laboratory Safety Manual](#).)
- In other work areas, document the required procedures for safe use of hazardous chemicals and required personal protective equipment using a Job Hazard Analysis (JHA) or Job Safety Analysis (JSA).

You must ensure an assessment is made for chemical hazards when performing new or unusual, non-routine tasks. Methods are described in Section 7. Documenting Safe Procedures.

You must inform personnel about the general provisions of the HazCom program and refer them to a copy of the [UW Chemical Hazard Communication \(HazCom\) poster](#) which must be posted on each departmental or unit safety bulletin board. Methods are described in Section 8. HazCom Training.

You must ensure employees receive work-unit-specific training about the hazardous chemicals in use prior to the first use of the chemicals, and when there is a change in how the chemicals are used or when a chemical or chemical process with new hazards is introduced. Training must cover the topics described in Section 8. HazCom Training.

There are several other mandatory topics. You must ensure all employees are informed on an annual basis about asbestos in the building materials. Inform new employees about any other hazardous condition within the work area. You must inform workers on an annual basis that EH&S and the work unit or department, if applicable, maintain exposure records, including air monitoring results (if the work area was monitored by EH&S or the work unit/department) and that EH&S maintains information about the chemicals in use in the workplace. (See Section 8. HazCom Training for details.)

You must maintain records that the training was provided for each employee who is likely to use or be exposed to the work area chemicals and procedures. Methods are described in Section 8. HazCom Training.

If your workers use consumer products such as furniture polish or art supplies extensively during a shift, you must ensure the item is included in the MyChem inventory (See Section 4. Tracking Hazardous Chemicals) and personnel are trained. Training methods are described in Section 8. HazCom Training.

If you provide a chemical to an organization outside of the UW, you must ensure it is labeled and an MSDS is prepared using the methodology provided in Section 9. Providing an MSDS/SDS and Label for a UW-Synthesized Chemical. If you wish to use an alternate method, your proposed methodology must be maintained within the organizational unit and approved by EH&S.

If UW activities will be conducted that could expose contractor personnel to chemical hazards, the contractor must be informed of the hazards. You should take action to restrict your activities so as to not create an exposure, or else provide information as requested by the UW contract representative to the employers concerning chemical hazards present in the work area. Methods are described in Section 10. HazCom Involving Contractors.

Conversely, if your unit purchases services from a contractor that involve the contractor potentially exposing UW personnel to chemical hazards or other hazards, you as the UW contract representative must inform the contractor that they must provide information about the hazard to the UW. Methods for accomplishing this are also described in Section 10. HazCom Involving Contractors.

EH&S. EH&S is responsible for:

- Developing the University-wide program and assisting units in achieving compliance
- Providing regulatory and emergency agencies with chemical quantity information
- Maintaining a Material Safety Data Sheet library
- Maintaining certain other records pertaining to chemical use
- Developing program support materials
- Evaluating program effectiveness

EH&S has the responsibility to develop the University-wide chemical hazard communication program and assist operational units with achieving compliance with all the regulations addressing chemical hazard communication. Requirements for the UW HazCom program are set in UW Administrative Policy Statement (APS) 12.5 and suggested methods to accomplish the required activities are described in multiple web pages (printed here in their entirety).

EH&S is also responsible for providing the UWPD, the US Environmental Protection Agency, and the US Department of Homeland Security - and other agencies upon request such as Washington Department of Labor and Industries - information as to chemical locations and amounts. EH&S uses the MyChem system as a tool to provide this required information. Therefore, all UW units are required to feed into the MyChem system.

EH&S is also responsible for collecting Material Safety Data Sheets (MSDSs) for items delivered to the University and making them available to all University units. EH&S uses the MyChem system to manage that collection. Whenever possible, MSDS collections from suppliers that provide frequent shipments to the University will be periodically uploaded into the MyChem system electronically. Individual MSDSs provided by operational units to EH&S or obtained by EH&S from manufacturers / suppliers will also be electronically added to MyChem by EH&S.

EH&S is also responsible for maintaining any exposure records associated with monitoring results and any assessments of exposure generated, and historical data of chemical use. These records are to be kept for the duration of any employees tenure plus 30 years.

EH&S also develops, updates, and provides training and instructional materials and informational materials concerning University-wide aspects of the Chemical Hazard Communication Program. As resources permit, EH&S can provide training concerning specific hazards as requested by operational units.

EH&S is also responsible for developing procedures to evaluate the effectiveness of the HazCom program. At this time, the procedures are to develop surveys annually to be sent to supervisors and employees concerning determining what they know and do not know about the HazCom program.

Chemical Hazards Advisory Committee Oversight. The UW Chemical Hazards Advisory Committee will review chemical use programs at the University of Washington and recommend changes to EH&S as required.

3. IDENTIFYING HAZARDOUS CHEMICALS

University departments, units, and/or laboratories are required to inform employees of chemical hazards if the chemical itself is hazardous or if it can release a hazardous component during normal use or accidental discharge. Chemicals include gases and liquids stored in gas cylinders, and solids if a hazardous chemical could be released during possible work tasks. The following table shows the different ways of identifying whether a chemical must be included in the HazCom program. The links go to more complete paragraphs later in this section.

Explanatory Table of Actions Needed when Identifying HazCom Chemicals

Situation	Examples	Your Actions
A container received from a supplier holds a chemical, or a product is known to have hazards (“Contained hazardous chemicals”)	<ul style="list-style-type: none"> • Bottle of acetone • Compressed gas cylinder • Lead brick 	<ul style="list-style-type: none"> • Check label, MSDS, and other reference materials and determine that it’s hazardous • Add to MyChem inventory • Keep labels in good condition • Train employees
Personnel mix up a process chemical and keep for future use (“Mixed” hazardous chemicals)	<ul style="list-style-type: none"> • Dilution of a concentrated acid • Solvent mixture poured into process reservoir 	<ul style="list-style-type: none"> • Check sources and determine that it’s hazardous • Note in SOPs or JHAs • Label container • Train employees
A procedure generates potentially hazardous contaminants from “non-hazardous” materials (Contaminants caused by work processes)	<ul style="list-style-type: none"> • Melting glassware • Cutting nylon rope or plastics with a “hot knife” • Sanding lumber 	<ul style="list-style-type: none"> • Recognize the hazard • Note in SOPs, JHAs or Health and safety plan • Train employees
Personnel receive “exempt” materials from a supplier (Exempt materials)	<ul style="list-style-type: none"> • Cosmetics, food, food additives, beverages, liquor, tobacco, or tobacco products for human consumption • Drugs as pills or tablets (including any in first aid kits) • Biological materials with no chemical hazards • Sealed radioactive sources 	<ul style="list-style-type: none"> • Check that materials are indeed exempt (no other actions needed for those materials)
Personnel use small quantities of “consumer products” (Consumer products)	<ul style="list-style-type: none"> • Spray furniture polish used to clean your office’s desktops • Marker pen used to highlight dates on a chemical container label 	<ul style="list-style-type: none"> • Check that materials are indeed consumer products used as a typical consumer may use them (no other actions needed for those materials)*
Personnel use large quantities of “consumer products” containing a hazardous chemical (Consumer products)	<ul style="list-style-type: none"> • Glass cleaner used throughout a shift • Several cans of aerosol spray paint used each day 	<ul style="list-style-type: none"> • Identify that use is intensive • Note in SOPs, JHAs or Health and safety plan • Add to MyChem inventory • Train employees

* If small amounts of consumer products are the only materials used by the employees, you must inform them about the HazCom program in general.

“Contained” hazardous chemicals. To identify whether a container holds hazardous chemicals:

- Look on the label and Material Safety Data Sheet / Safety Data Sheet (MSDS/SDS) for words such as “Danger,” “Caution,” “Warning,” or containing warnings such as “irritant,” “flammable,” “sensitizer,” “corrosive,” “carcinogenic,” etc., or that indicate that personal protective equipment such as chemical-protective gloves or a respirator may be needed if the chemical is used or spilled.
- Also, a chemical should be identified as hazardous if there is a hazard coding with words, numbers, or colors such as from the NFPA (National Fire Protection Agency) or HMIS (Hazardous Materials Information System) of “1” or greater or it is noted as having a “chronic” hazard.
- Also, a chemical must be identified as hazardous if there is any known, documented evidence that the chemical or its chemical byproducts formed from normal use may cause a known health effect, or if evidence shows there is a physical hazard due to the chemical’s properties of being flammable, or a combustible liquid, a compressed gas, an explosive, an organic peroxide, an oxidizer, or is pyrophoric, unstable (reactive), or water-reactive.

“Mixed” hazardous chemicals. Mixtures, dilutions and chemically-reacted preparations generated in the work area such as stock solutions produced for laboratory procedures do not need to be listed in the MyChem inventory, but other aspects of the UW Chemical HazCom program may need to be met. For example, the container must be labeled unless the preparation will be immediately used up. (See Section 6. Container Labeling for information as to labeling the container.) Also, employees may need to be trained on the chemical’s hazards depending on whether possible reactions increased or created new hazards. With respect to determining the hazards if a mixture is prepared in house:

- If there is knowledge about the hazards of the mixture, identify those hazards, label containers appropriately and train employees accordingly.
- If there is no knowledge about the mixture as a whole, assume the hazards are consistent with the hazards of the constituent components, unless
- A reaction has proceeded in the mixture which is likely to have changed the chemical’s nature, at which point the hazards of similar reacted mixtures can be used to presume hazards if no better information is available.

Contaminants caused by work processes. Your work processes using non-toxic materials may actually cause potentially hazardous exposures. If you have situations such as the following examples, and similar activities, do not add the materials to your MyChem inventory and do not label the materials, but the processes should be evaluated as part of the hazard assessment steps described in Section 7. Documenting Safe Procedures. Training covering the hazards and the protective measures for such “non-traditional chemical” exposures must be done as part of your chemical hazard communication training program if you have indications from your work place or from other work places with similar activities that such exposures may injure workers. Contact EH&S (206-543-7388) if you have questions about making this determination.

- Melting glassware to re-shape it,
- Disturbing guano during a field trip to a cave,
- Using a “hot knife” to cut nylon rope or plastics,
- Handling animals in research causing release of allergens,

- Entering university buildings which may have asbestos in the building's walls,
- Cutting or sanding lumber which could create possibly hazardous sawdust levels,
- Activating a fire suppression system that may have chemicals stored outside your work area but could discharge into your work area.

Exempt materials. The following materials are exempt from the UW Chemical HazCom Program. They do not need to be listed in the MyChem inventory nor MSDSs maintained, but labeling, training, and controls may be required by other safety programs:

- Food, food additives, beverages, liquor, tobacco, tobacco products and cosmetics intended for human consumption or use (unless adulterated for research purposes or academic programs),
- Drugs that are in the final form of a pill or tablet for delivery to a patient (including those kept in a first aid kit),
- Materials whose only hazard is biological,
- Sealed radioactive sources, or
- Hazardous waste.

Consumer products. Other types of hazardous material that may be exempt are small quantities of consumer products packaged for distribution to and use by the general public that are used in the same manner and frequency for office, janitorial, or minor maintenance purposes (such as pens, markers, glass cleaner, furniture polish, etc.). These materials are exempt from the inventory and MSDS maintenance requirements as long as the use does not exceed that of a typical consumer. Supervisors whose employees may use a consumer product for an extended period during a work shift should include the item on the MyChem inventory and train employees concerning the item's hazards.

If you have questions about identifying hazardous materials, contact EH&S at 206-543-7388 or ehsdept@uw.edu.

4. TRACKING HAZARDOUS CHEMICALS

University departments, units, and/or laboratories are required to enter and maintain a hazardous chemical list/inventory for all chemical storage and use locations. The inventory must be entered online in the [MyChem](#) database so that the UW can comply with local, state, and federal regulations. New chemicals must be added as they are obtained and the list/ inventory must be reviewed on an annual basis to ensure all chemicals are listed.

Probably the most common situation is that a work unit will assign one or more specific individuals to maintain the information in MyChem. Individuals entering data into the MyChem system need to register in order to have their access authorized. To register, go to <http://www.ehs.washington.edu/epomychem/index.shtm> and select "Apply now for a MyChem account."

A class is available covering MyChem procedures and features (register at <http://www.ehs.washington.edu/epomychem/index.shtm> or by telephone to 206-616-4046).

Staff should conduct a physical inventory of hazardous chemicals annually. (This is also an excellent time to identify chemicals that should be disposed.) A handy form for compiling the data needed for MyChem is available at <http://www.ehs.washington.edu/epomychem/mychemworksheet.pdf>. This web page also includes coding instructions (such as type of container) which are valuable for entering data into the MyChem inventory. The quantity levels which should be entered into the inventory should be the highest stock levels likely to be maintained – each day's level does not need to be tracked. However, at the time of annual review, it is a good idea to assess whether changes in work procedures have significantly changed the quantities kept on hand, which would imply you need to up-date MyChem.

Bulk quantities of hazardous chemicals stored in tanks or process equipment, such as in research equipment reservoirs, need to be included in the MyChem inventory.

If a department has implemented a departmental inventory system not using MyChem, the department must develop procedures in conjunction with EH&S to enable the inventories to be downloaded into the MyChem system. The inventories should be routinely downloaded in accordance with a schedule set by EH&S (206-616-4046).

MyChem has many features which can potentially save departments money or make operations more efficient, such as periodically checking the chemical exchange feature as a means to obtain surplus chemicals from another department. Additional answers to questions or concerns about using MyChem or adding your chemical inventory to MyChem are available by contacting EH&S at 206-616-4046.

5. HANDLING MATERIAL SAFETY DATA SHEETS (MSDSs) / SAFETY DATA SHEETS (SDSs)

The following procedures are required for all University of Washington work areas, unless EH&S has given you written approval of alternate procedures. (For the purposes of this section, an SDS is considered equivalent to an MSDS.)

The most significant requirement is that the MSDSs for your chemicals must be readily accessible to employees when at work – they can't be locked in a file cabinet unless everyone has a key. (Employees working at a variety of locations during a shift should have access to MSDSs at a centralized location – such as where they may clock in.)

Two methods of retrieving MSDSs are available - electronic copies or paper copies. You can choose the method you prefer if your department has not specified the method. Along with information about the method you may use, please also review the MSDS maintenance info at the end of this section, to help EH&S manage the MSDS repository.

Electronic Retrieval

MyChem is the preferred method for access since the inventory line is linked automatically to the specific MSDS. If using electronic retrieval, all workers must be trained and must be able to demonstrate that they can retrieve or obtain a chemical's MSDS using the electronic access system. All personnel having a UWNetID have access to the MyChem MSDS repository.

Electronic retrieval could also consist of retrieval from web sites or from compact disks or other storage device, but all employees must be able to show that they can get any specific MSDS as needed. It is desirable that each employee demonstrate that they can retrieve a specific MSDS, such as possibly having a contest during a training class to see who can get the MSDS for one of the work area's chemicals the quickest.

In case you lose access to MyChem and you need access to an MSDS, you should contact EH&S (206-616-3441 or if no answer 206-543-7262) who can fax or otherwise provide an MSDS for chemicals in the MyChem system within the work shift. If this is necessary at a time other than routine work hours, contact the UWPD at 206-685-UWPD (8973), and they can contact the EH&S Staff on Call representative who can contact EH&S personnel experienced in accessing the MyChem MSDS files.

MSDSs for hazardous chemicals are generally readily accessible electronically to employees using the MyChem inventory. However, for use during training, or due to possible emergencies when a person is contaminated and needs to go to the emergency room, we recommend you maintain a paper copy of some MSDSs - those hazardous chemicals stored and used that might have the highest risk of exposure or are most likely to be spilled.

Paper Copy Retrieval

If you prefer to use paper copies rather than retrieving the MSDSs from MyChem, all your employees must demonstrate that they can locate the correct MSDS from the MSDS file. There should be an obvious index for the file, listing each chemical by its common name (as shown on the chemical label), and the MSDSs should be filed following the index in the order shown in the index.

The index must be updated whenever a new chemical is added to the inventory and the paper copy must be added to the file at that time. When chemicals will no longer be used and there is

no more stock, the chemical should be deleted from the index and the MSDS removed. The file should be checked annually to verify that all MSDSs are present and legible.

An inventory of hazardous chemicals must still be maintained in MyChem. (Refer to Section 4. Tracking Hazardous Chemicals for more information.). If a paper MSDS is more than five (5) years old, MyChem should be checked to see if a more current copy is available. The MSDS index and MyChem inventory should be cross-checked annually to check that both lists are complete and that all necessary MSDSs/SDSs are available.

Additional MSDS Maintenance Information

If you receive an MSDS for a product with no MSDS in MyChem (or an out-of-date MSDS in MyChem), please send the MSDS to EH&S to be added to the central repository. (Address to: EH&S MSDS Coordinator, Box 354110)

EH&S will assist in compiling work area MSDS collections and will request an MSDS from the manufacturer for those MyChem inventory line chemicals with no MSDS on file in the central database repository as time is available.

We recommend that you have a copy of the appropriate MSDS(s) when talking to or visiting the emergency room following a hazardous chemical exposure.

A Safety Data Sheet (SDS) generated in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) provides similar information to that of an MSDS and is an acceptable substitute for a chemical's MSDS.

6. CONTAINER LABELING

Newly-Received Chemicals Chemical containers must have an acceptable label when received from the manufacturer or they must be rejected and returned to the manufacturer. The information on the label must be legible and in English and include the chemical's identity, its hazards, and the name and address of the manufacturer.

Workplace Labeling of Containers If a container label becomes illegible during use or if a hazardous chemical is transferred from its original container to a second container, the container must have affixed to it an extra copy of the original container label, or a legible hand-written label that includes the required information, or a generic label (available from various vendors) either pre-printed or filled in with the required information.

Exemption: If the chemical is put into a second container that will be under the direct control of the individual who transferred it and all of it will be consumed during the same shift, then the second container does not need to be labeled.

At a minimum, the chemical container label must identify:

- The name of the chemical
- Any signal word ("Danger" or "Warning") if labeled per GHS
- The chemical's physical hazards and health hazards, including specific target organs if they are at special risk, and including all hazards which are identified with the signal words "Danger" or "Warning" if the chemical is classified per the GHS

The label may include other information such as the date the chemical was received, the date a container was opened (if the chemical could degrade or react over time), the amount of chemical still remaining in the container, the initials of the person who prepared the formulation, or any other information useful for safe and efficient operations.

Labeling Substances Prepared In-House Reagents, stock solutions, and bulk quantities of chemicals mixed for in-house processes also need to be labeled with identification as to the chemical and its hazards unless the container will be emptied that work shift. The chemical name may be a standard name for that mixture as described in the literature or by an equipment manufacturer's recommendation, or the name associated with the chemical in a specific step of the Standard Operating Procedure, or the name could be the list of the constituent components.

With respect to determining the hazards if a mixture is prepared in house:

- If there is knowledge about the hazards of the mixture, identify those hazards on the label.
- If there is no knowledge about the mixture as a whole, identify the constituent components and their hazards, unless
- A reaction has proceeded in the mixture which is likely to have changed the chemical's nature but there is no historical information about that specific reaction's hazards, at which point the hazards of similar reacted mixtures can be used to anticipate the hazards. You should be cautious of other possible, unexpected hazards if this approach is necessary.

Unusual Labeling Situations Long runs of tubing or piping, containers too small for labels, containment vessels installed into a process but may leak or be opened, containers which would become unusable for their intended purpose if labeled with a marker or large adhesive-based label and which will hold chemicals beyond the end of the shift of the individual filling the container, the wall outlet for a gas or liquid piped in from a remote reservoir, and containers in similar situations must still be identified. Any labeling method can be used which enables employees and visitors from other agencies such as the fire department to identify the chemical and the hazards. This could be tags, placards or signs identifying the materials and their hazards, color or numeric codes or room diagrams identifying locations of the chemicals and hazards, or other readily observable labeling method.

For peroxide-forming chemicals, such as those listed in Section 2 of the UW Laboratory Safety Manual or those with a material safety data sheet (MSDS) which states the chemical can form peroxides, the container should be labeled with the UoW 1716 label shown at the right, and indicate such information as the date the original container was first opened. These labels are available at the Chemistry Stockroom or through chmwaste@uw.edu.

If a specified “Chemical of Interest” per US Department of Homeland Security is procured (listed below), a label as shown at the right must be attached to the container to remind workers of special requirements.

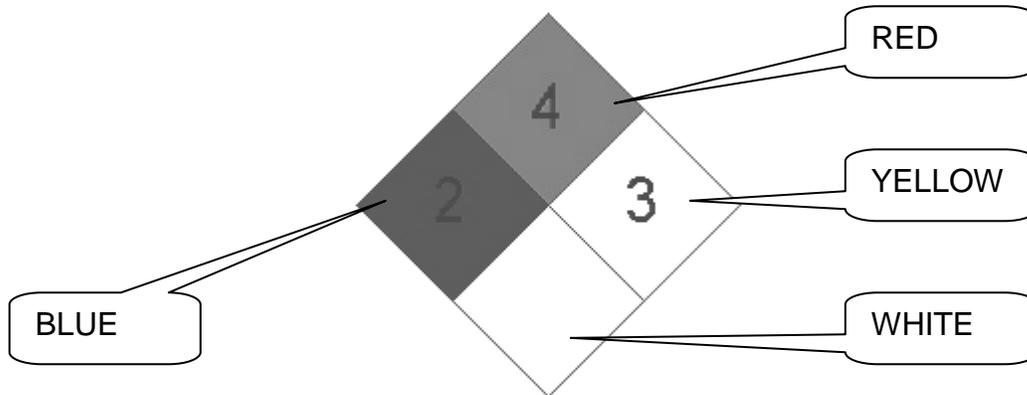
This chemical is federally regulated and **cannot** be shipped without prior EH&S notification. Contact EH&S at 206-685-0585 for details.

Chemicals of interest which must be labeled (and their CAS numbers) are:

Acetone cyanohydrin, stabilized (75-86-5)	Magnesium phosphide (12057-74-8)
Aluminum phosphide (20859-73-8)	Methyldichlorosilane (75-54-7)
Boron tribromide (10294-33-4)	Phosphorus oxychloride (10025-87-3)
Bromine pentafluoride (7789-30-2)	Phosphorus pentasulfide (1314-80-3)
Bromine trifluoride (7787-71-5)	Phosphorus trichloride (7719-12-2)
Calcium phosphide (1305-99-3)	Potassium phosphide (20770-41-6)
Chlorine dioxide (10049-04-4)	Sodium phosphide (12058-85-4)
Chloroacetyl chloride (79-04-9)	Strontium phosphide (12504-16-4)
Chlorosulfonic acid (7790-94-5)	Sulfuryl chloride (7791-25-5)
Lithium amide (7782-89-0)	Titanium tetrachloride (7550-45-0)
Lithium nitride (26134-62-3)	Trichlorosilane (10025-78-2)

Rooms where hazardous materials are stored or used in quantities that exceed certain thresholds (“H” occupancy as defined in the International Fire Code), and rooms dedicated to storing hazardous materials, must be posted with a National Fire Protection Association (NFPA) diamond sign (NFPA Standard 704) on all doors. Call 206-543-0465 for further information and signs. The Seattle Fire Department now requires these signs on all new or renovated laboratories in Seattle

and EH&S will post these signs. Explanatory material of the codes used on the NFPA sign is shown below.



Hazard:	Fire Hazard	Health Hazard	Reactivity
Color:	Red	Blue	Yellow
Location:	Top Quadrant	Left Quadrant	Right Quadrant
Rating	Description of Numeric Rating		
4	Flash Point <73°F, Boiling Point <100°F	Deadly	May Detonate
3	Flash Point <73°F and Boiling Point ≥100°F, or Flash Point 73°F - 100°F	Extreme danger	Shock and heat may detonate
2	Flash Point >100°F and ≤200°F	Hazardous	Violent chemical change
1	Flash Point ≥200°F	Slightly hazardous	Unstable if heated
0	Will not burn	Normal material	Stable

The bottom diamond segment is white, with any specific hazard codes printed in it. These specific hazards include OX (oxidizers), ACID (acids), ALK (alkali materials), COR (corrosive materials), and W (use no water).

Piping and tubing containing hazardous chemicals should be identified in some manner such that all employees can identify the pipe's contents. Tags or signs on the pipes / tubing or a room diagram showing the runs should be used in preference to "word of mouth."

Chemicals produced by UW entities and put into commerce may have specific labeling requirements beyond the scope of this guidance manual. These materials and their labeling requirements include:

- Pesticides (as defined in the Federal Insecticide, Fungicide and Rodenticide Act - 7 USC 136 et seq. and regulations issued by the EPA),
- Toxic chemicals and mixtures (as defined in the Toxic Substances Control Act - 136 USC 2601 et seq. and requirements issued by the EPA),

- Foods, food additives, color additives, drugs, cosmetics, or medical/veterinary devices or products including materials intended as ingredients (such as flavors or fragrances) (as defined in the Federal Food, Drug, and Cosmetic Act - 21 USC 301 et seq. or the Virus-Serum Toxin Act of 1913 - 21 USC 151 et seq. and regulations issued by the Food and Drug Administration or the Department of Agriculture),
- Distilled spirits (beverage alcohols) wine or malt beverage for nonindustrial use (as defined in the Federal Alcohol Administration Act - 27 USC 201 et seq. and regulations issued by the Bureau of Alcohol, Tobacco, and Firearms),
- Consumer products or hazardous substances (as defined in the Consumer Product Safety Act - 15 USC 2051 et seq. and the Federal Hazardous Substance Act - 15 USC 1261 et seq. and regulations issued by the Consumer Product Safety Commission), and
- Agricultural or vegetable seeds treated with pesticides (as defined in the Federal Seed Act - 7 USC 1551 et seq. and requirements issued by the Department of Agriculture).

If a chemical is synthesized and sent to another institution, an MSDS or SDS and container label must be generated. See Section 9. Providing an MSDS / SDS for a UW-Synthesized Chemical.

Hazardous waste is exempt from the Chemical Hazard Communication Program and inventory requirements in MyChem, but label requirements are mandated in other UW program documents and personnel handling hazardous wastes must be trained concerning potential hazards and necessary precautions. Any container re-used to hold waste must be appropriate for that waste. Labeling of hazardous waste containers should be in accordance with the instructions on the web page <http://www.ehs.washington.edu/epowaste/chemwaste.shtm> .

If you have questions about container labeling, contact EH&S at 206-543-7388.

7. DOCUMENTING SAFE PROCEDURES

Basic requirements for evaluating chemical hazards and selecting protective measures are the same whether an employee manipulates chemicals in a chemical laboratory, or if the employee uses chemicals in a shop or other non-chemical-lab location. However, different regulations require somewhat different formats for documenting the assessment. Work situations that may need to be assessed fall into five main categories:

- Routine tasks in a chemical laboratory,
- Routine tasks in a shop, non-chemical lab or other work area,
- New or infrequently performed tasks,
- Re-assessment after an accident or incident, and
- Situations that could impact anyone.

Assessing Routine Tasks in a Chemical Laboratory Assuming that you are evaluating a procedure which has been done before in your laboratory or another lab where you have access to a complete description of the procedures (if a new procedure, see the new procedure subsection below), you should:

- Identify the procedure and the chemicals and equipment involved,
- Based on the chemicals and processes to be used, list all the hazards that are associated with the particular procedure (a way of categorizing hazards is shown in Appendix B. HazCom Training Categories and also available here [HazCom_Training_Categories.doc](#)),
- Identify the precautions, safety equipment, and personal protective equipment used, being as specific as possible, As part of this assessment, assess whether a less hazardous chemical can be used or if a lesser amount of the chemical can be used to accomplish the task.
- Describe spill cleanup procedures and waste disposal procedures,
- Identify any authorizations needed prior to conducting the procedure,
- Document the requirements in a Standard Operating Procedure (SOP).

SOPs can be set up for a standard procedure but using different chemicals at different times (such as distillation of flammables), or for a particular chemical, or for a group of chemicals. Example SOPs are shown on the EH&S web site at <http://www.ehs.washington.edu/manuals/lsm/examplesoplms.shtm> and a more complete description of the SOP development process can be found in Section 6 of the University of Washington Laboratory Safety Manual (<http://www.ehs.washington.edu/manuals/lsm/lsm6.pdf>).

Assessing Routine Tasks in a Shop, Non-Chemical Lab or Similar Work Area Assess the tasks thoroughly by making use of the knowledge and experience of those performing the task most frequently. Actual steps include:

- Select the task to be performed,
- Break the task down into steps,
- Identify the hazards in each step, For chemical hazards, assess whether a less hazardous chemical can be used or if a lesser amount of the chemical can be used to accomplish the task.
- Determine safety measures required to reduce the risks from the different hazards to an acceptable level,
- Document as a Job Hazard Analysis (JHA, also called a Job Safety Analysis or JSA), An example JHA is at [Example_JSA.doc](#) and a word template is at [JSA_Word_Template.doc](#).

When identifying the hazards in each step, ask yourself or those who perform the task most often as many leading questions as possible, such as “Is this step always done in the same place? If it is done outdoors, how does weather or darkness affect it? Do the people doing this always have access to the same chemicals and equipment?” etc.

An “example” or typical JHA/JSA form is shown in Appendix C. Example Job Safety Analysis / Job Hazard Analysis Form [Example_JSA.doc](#) and a blank form as a template is available on the EH&S web site ([JSA_Word_Template.doc](#)). If chemical protective gloves, goggles, or clothing, are necessary to provide protection, the use of the personal protective equipment (PPE) also has to be documented as a certification for PPE as described in APS 10.4 Personal Protective Equipment and supporting web documents.

Assessing New or Infrequently Performed Tasks Occasionally, University employees may be required to perform hazardous new or non-routine tasks such as making a confined space entry, performing some scheduled, infrequent, major repair or maintenance task, or scaling-up a new chemical process involving chemical hazards. Prior to starting work on such projects, individual departments or organizational unit supervisors should:

- Specify and define the unusual task(s) and the steps inherent in the work to be done,
- Identify all potential chemical, physical, radiological, and biological hazards that you and others familiar with the steps can imagine (categories of chemical and physical hazards are listed in Appendix B. HazCom Training Categories [HazCom_Training_Categories.doc](#)), If the process involves large amounts of highly toxic, reactive, flammable, or explosive chemicals (chemicals listed in Appendix A of WAC 296-67 with pounds exceeding the threshold quantity listed in <http://www.lni.wa.gov/wisha/rules/hazardouschemicals/PDFs/Chemchart.pdf>), you must follow the formal methods for identifying hazards in WAC 296-67, at <http://www.lni.wa.gov/wisha/rules/hazardouschemicals/default.htm>.
- If the task involves lesser amounts of highly dangerous materials or does not involve one of the chemicals listed in WAC 296-67 Appendix A, continue the assessment by researching the potential hazards and how the work was done at other times,
- Assess whether the hazards may result in exceptional risks and devise methods to minimize the risks to an acceptable level, As part of this assessment, assess whether a less hazardous chemical can be used or if a lesser amount of the chemical can be used to accomplish the task.
- Document the hazards and planned procedures, and
- Provide information and training about the proposed work to involved employees, and revise the plan as necessary if they identify problems with the proposed work.

Information should cover specific chemical hazards, protective/safety measures to be taken by employees, and the steps which were implemented to lessen the hazard potential of the operation. Document as a Job Hazard Analysis (JHA) unless working in a chemical laboratory, where it must be documented as a Standard Operating Procedure (SOP). Consult with EH&S (206-543-7388) if there are questions about hazards, risks or procedures.

Re-assessing Tasks after an Accident or Incident Make sure the accident report is entered into the Online Accident Reporting System (<http://www.ehs.washington.edu/ohsoars.index.shtml>), which will provide some guidance in analyzing the cause of the accident by virtue of filling out the form. Try as best as possible to identify the actual cause(s) of an accident rather than simply identifying “the last step in the chain of events” leading to the accident. Identify and document any feasible steps you can identify that will reduce chances of a similar accident or incident

happening. Contact EH&S at 206-543-7388 for additional advice on conducting an accident investigation as necessary.

If an accident investigation is performed by others, use their findings to help determine the tasks/equipment/training etc. that can be changed to reduce the chances of a similar accident occurring. If you know of other units performing the same procedure, please notify them of the improvements you have made in the process.

Update the procedural documentation as necessary, such as in a Standard Operating Procedure (SOP), Job Hazard Analysis (JHA) and departmental health and safety plan.

Potential Situations Which Could Impact Any UW Employee Assessing chemical hazards that could possibly affect any UW employee probably will be done by EH&S or another responsible department, who will provide advice for the entire university. This category of evaluation is meant to address exposures arising out of a situation where a person comes to work and is unexpectedly exposed to materials not part of that person's assigned duties. Examples of such situations include:

- Several people in a room start smelling an unknown odor. (See <http://www.washington.edu/emergency/emergency-procedure-posters> and <http://www.ehs.washington.edu/ohs/iaq.shtm> for response and prevention information.)
- Yellow-white powder starts falling out of an envelope received in the mail. (See <http://www.washington.edu/emergency/emergency-procedure-posters> and <http://www.usps.com/cpim/ftp/posters/pos84.pdf> for response and prevention information.)
- Someone damages possible asbestos materials in the area of a building you occupy. (See <http://www.ehs.washington.edu/ohsasbestos/index.shtm> for information to protect yourself and others. Annual training is required concerning this topic.)

Documentation of the desirable response actions and any training which should be taken in anticipation of such possible hazards is best included in each department's health and safety plan and in UW programs specific to such situations.

8. HAZCOM TRAINING

Who Must Get the Training All employees must receive effective hazard communication training. “Employees” are considered to be those who qualify for workers compensation in event of injury or illness. This includes those paid through the University, plus visiting scientists and many volunteer workers who are part of a formal volunteer worker program.

Students would not fall into this category (unless they’re paid or otherwise qualify for workers compensation) but protective means should be equivalent – i.e., class assignments should include research as to chemical hazards and students should receive training as to safe procedures, and how to correctly use PPE and safety devices such as fume hoods.

Some categories of employees that you may have questions about are:

- Employees whose only “chemical exposure” would be when using items which are packaged as “consumer products” (such as pens, markers, furniture polish, glass cleaner, etc.) and who use them similarly to typical consumer use: These employees must receive training about the UW HazCom program and their rights when hired, and should receive a copy of the UW brochure (HazComOfficeBrochure7_05_newWeb.pdf) during new employee orientation. However, if the job entails more frequent use of chemicals, such as a person using art supplies to make posters on a weekly basis or a person assigned to clean items all work shift using a common household cleanser, formal hazard communication training is needed. Supervisors of those workers intensively using consumer-packaged chemicals must ensure training is completed as discussed below.
- Employees who do not routinely handle chemicals but often walk through the chemical work area: These employees must be trained as to the hazards of the chemicals that are in use; how to don and doff and the limitations of any PPE required for everyone who enters the area; and, what to do if an emergency were to occur.
- For work units where chemicals are stored but employees do not use them, employees still must be trained as to the possible hazards from the stored chemicals and what to do in case of emergency. Additional training may be necessary if new items being stored present new hazards or require different response procedures.

Training Requirements A poster describing the UW Chemical Hazard Communication Program must be posted on each departmental/unit safety bulletin board. Employees must be informed of the location of the departmental/unit safety bulletin board, most commonly during new employee orientation.

Most of the work area specific chemical safety (HazCom) training requirements are one-time and initial (prior to exposure to a hazard), but some requirements are annual. Periodic re-training about hazards and protective measures is not normally required. But, if employees demonstrate that they did not retain the initial training, they need to receive re-training. Individual employee training must be effective to the point that the employee can:

- Identify the hazardous chemicals that are stored or used in the work area that may cause exposures for workers and bystanders. Ideally, the employee would be knowledgeable enough to refer to the area’s chemical inventory as a means of remembering different types of hazards. (Initial)
- Recognize work processes that create exposures from materials that may not be in the MyChem inventory, such as melting glassware, sanding lumber, conducting a field trip into a cave contaminated with guano, handling animals that may generate allergens, etc. (Initial)

- Get the appropriate Material Safety Data Sheet (MSDS) for any chemical used by that employee. The worker must be able to either retrieve an MSDS by accessing MyChem or other electronic file, or by finding a paper copy in a local file, whichever method of MSDS storage is used by the work area. Each person should be able to do this quickly, such as within five minutes, even if not fluent in English. (Initial)
- Identify the health hazards (e.g., carcinogens, irritants, etc.) and physical hazards (e.g., flammable chemicals, compressed gases, etc.) of the hazardous chemicals in use. This could be from memory of a training session, by using information found on the chemical container label or in the chemical's MSDS/SDS, or by referring to workplace guidance documents such as standard operating procedures or other available references. (Initial)
- Know the procedures and equipment to be used to lessen or prevent exposure to hazardous chemicals during different work tasks, including what should be done in event of a spill or a failure of a protective device. Training in use of required personal protective equipment (PPE) such as gloves and eye protection must be done in detail as described in APS 10.4 and supporting guidance material. Workers must be able to identify what PPE is required during which tasks. Employees should refer to Standard Operating Procedures (SOPs) or Job Hazard Analyses (JHAs) when available. (Initial)
- Be able to relate how they would determine the presence or release of hazardous chemicals in the work area, such as by seeing a spill, smelling an odor, hearing a hissing noise from a pressurized system, hearing an alarm from continuous monitoring equipment, or any other detection method that would signal a chemical release. (Initial)
- Be able to tell the most likely symptoms which may result from an over-exposure to the chemicals used by the employee. The employees should know that they can get a medical consultation at the UW Employee Health Clinic servicing their work area if they start to show symptoms of exposure, if a possible over-exposure occurs such as during a spill clean-up, or if a measurement shows a level above a permissible exposure limit, (Initial)
- In laboratories where chemicals are manipulated, remember that WAC 296-828 (Appendix A in the Laboratory Safety Manual) and the laboratory's Chemical Hygiene Plan including SOPs provide the requirements for working safely with hazardous chemicals, and be able to retrieve the laboratory's copies of these documents. Employees also must be informed of any exposure limits (Washington State Permissible Exposure Limits – PELs – in WAC 296-841) or guideline limits for the laboratory's chemicals, where additional references about laboratory chemical hazards can be found, and that EH&S can provide advice and assistance for controlling exposures to hazardous chemicals. (Initial)
- In shops, offices, general industrial work areas, or other non-chemical-laboratory work areas, be able to refer to the UW Chemical Hazard Communication poster on the safety bulletin board or otherwise be able to remember that WAC 296-800-170, UW APS 12.5 and supporting web pages provide information about Chemical Hazard Communication. You should tell employees as to where these materials can be found on the web, or that EH&S can provide the documents. EH&S should also be identified as providing advice and assistance for interpreting the documents and for monitoring exposures to hazardous chemicals. Supervisors are also encouraged to make copies of the JHAs available to their employees that pertain to work tasks involving chemicals. (Initial)

- If processes cause airborne chemical levels to exceed permissible exposure limits or action levels, be informed annually of the chemical's hazards and the protective measures being used to reduce exposures. This annual training must continue until such time as process changes, improved ventilation or other fixes are enough to lower levels to less than the exposure limit for that particular chemical. (Annual)
- Identify that EH&S maintains exposure monitoring records and they are available for review by workers or their representative. If the department or work area has records of exposure monitoring, the employees must also be made aware of the existence of these records and their right to access them. By regulation, workers should be reminded annually of these records and their right of access. (Initial and annual)
- Identify that employees have a right to access their medical records. By regulation, workers should be reminded annually of these records and their right of access. (Initial and annual)

Additionally, all employees must complete annual training concerning asbestos hazards in the workplace. (Annual)

Many departments have described their training program in their departmental Health and Safety Plan.

Conducting the Training Suggestions on how to conduct training are described in the following paragraphs and in the appendixes. For the UW to meet the compliance criteria of Labor & Industries inspectors, we must demonstrate a "good faith" effort to train employees about the hazards and required precautions to control the hazards. You, as a supervisor, cannot simply give an MSDS or other reading materials to an employee and consider that sufficient – the employees must have a reasonable opportunity to ask questions and learn the safety requirements in your work area, prior to the hazardous chemical use.

Training can be done through any route, for example:

- During new employee orientation,
- During formal classes,
- By noting prior training for a newly arrived employee,
- By documenting knowledge and experience demonstrated on-the-job, or
- By providing on-the-job training.

The trainer should document that training was done or that the employee demonstrated proficiency and did not need additional training, and note the date and the training accomplished. If documenting proficiency, the trainer should check that the proficiency demonstrated covers all aspects of the tasks the employee will be expected to perform.

The supervisor is the primary person responsible for making sure employees are trained. Any knowledgeable staff may perform the actual training. EH&S offers some general information classes and a detailed class titled HazCom Train-the-Trainer class which provides information to familiarize an individual with chemical hazards in order to teach others in the work area. (<http://www.ehs.washington.edu/psotrain/index.shtm>)

Various training aids and devices are available to try to make things easier for training in the work area. One aid shows how chemicals may be grouped by hazard category (Appendix B. HazCom Training Categories, also retrievable at [HazCom_Training_Categories.doc](#)) One or more of these categories could be covered in a class. For example, if a work area has many chemicals that are

“skin irritants,” they could be all identified, and the precautions for use and response to take if an exposure occurs could be generalized. If any particular chemical in a group requires different precautions or response, it should be described specifically.

Another aid that provides hints for how to set up your training is at Appendix D. Training Class Hints, also available at [Training_Class_Hints.doc](#)),

After the initial training session(s), more training is required if new chemicals or processes having new hazards are introduced into the work area. Periodic re-training is not required for most subjects, but refresher training may be necessary if you note that employees are not following procedures correctly or not using protective measures properly.

GHS Training If the work area receives products coming from manufacturers or suppliers that are using the Globally Harmonized System of Classification and Labelling of Chemical Substances (GHS), personnel need training on the system. This system uses standardized signal words, pictograms, hazard statements, and precautionary statements on their labels and SDSs to provide safety information.

Chemical producers use the system to classify chemicals into major hazard classes and categories which are related to specific signal words, pictograms, hazard statements, and precautionary statements. The relationship between Hazard Class and Category, and the subsequent Signal Word and Pictogram is shown in the following table.

Hazard Class	Category Identifier(s)	Signal Word	Pictogram(s)
Acute Toxicity	1, 2, 3	Danger	Skull/Crossbones
	4	Warning	Exclamation Mark
Skin Corrosion	1A, 1B, 1C	Danger	Corrosion
Skin Irritation	2	Warning	Exclamation Mark
Eye Damage	1	Danger	Corrosion
Eye Irritation	2A	Warning	Exclamation Mark
	2B	Warning	None
Respiratory Sensitization	1A, 1B	Danger	Health Hazard
Skin Sensitization	1A, 1B	Warning	Exclamation Mark
Germ Cell Mutagen	1A, 1B	Danger	Health Hazard
	2	Warning	
Carcinogen	1A, 1B	Danger	Health Hazard
	2	Warning	
Reproductive Toxicity	1A, 1B	Danger	Health Hazard
	2	Warning	
Specific Target Organ Toxicity, Single Exposure	1	Danger	Health Hazard
	2	Warning	Health Hazard
	3	Warning	Exclamation Mark
Specific Target Organ Toxicity, Repeated or Prolonged Exposures	1	Danger	Health Hazard
	2	Warning	
Aspiration Hazard	1	Danger	Health Hazard
Explosives	Unstable, 1.1, 1.2, 1.3	Danger	Exploding Bomb
	1.4	Warning	Exploding Bomb
	1.5	Danger	None
	1.6	None	None
Flammable Gases	1	Danger	Flame
	2	Warning	None
Flammable Aerosols	1	Danger	Flame
	2	Warning	
Oxidizing Gases	1	Danger	Flame over Circle

Gases under Pressure	“Compressed”, “Liquified”, “Refrigerated liquefied”, “Dissolved”	Warning	Gas Cylinder
Flammable Liquid	1, 2	Danger	Flame
	3	Warning	Flame
	4	Warning	None
Flammable Solid	1	Danger	Flame
	2	Warning	
Self-Reactive Chemical	A	Danger	Exploding Bomb
	B	Danger	Exploding Bomb, Flame
	C, D	Danger	Flame
	E, F	Warning	Flame
Pyrophoric Liquid	1	Danger	Flame
Pyrophoric Solid	1	Danger	Flame
Self-Heating Chemical	1	Danger	Flame
	2	Warning	
Chemicals which Emit Flammable Gases when in Contact with Water	1, 2	Danger	Flame
	3	Warning	
Oxidizing Liquid	1, 2	Danger	Flame over Circle
	3	Warning	
Oxidizing Solid	1, 2	Danger	Flame over Circle
	3	Warning	
Organic Peroxide	A	Danger	Exploding Bomb
	B	Danger	Exploding Bomb, Flame
	C, D	Danger	Flame
	E, F	Warning	Flame
Corrosive to Metal	1	Warning	Corrosion
Unclassified ¹	N/A	None	None

¹ “Unclassified” means hazards that have not had a methodology developed yet for classifying severity, e.g., combustible dusts and asphyxiant gases.

The eight HazCom GHS pictograms are shown below. (Other pictograms showing environmental pollution and transportation concerns have also been standardized but are not shown below.)



Corrosion



Exploding Bomb



Flame



Flame over Circle



Gas Cylinder



Health Hazard



Skull/Crossbones



Exclamation Mark

If these labels and Safety Data Sheets are provided on chemicals in your work area, everyone using the chemical must receive training as to the pictogram meanings. For example, all workers should realize that a product labeled with a “Flame” (flammable) pictogram should not be stored in the same cabinet as a product labeled with a “Flame over Circle” (oxidizer) pictogram.

Personnel should also be trained to understand the hazard statements and to obey the precautionary statements. For example, the hazard statement for an acutely toxic gas in category “1” is: “Fatal if inhaled.” An example of one of the many precautionary statements for an acutely toxic gas is “If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.”

Training Documentation Employee training records must be maintained for HazCom training. These records should include who was trained, the date of training, and the subject(s) covered. Training materials should be retained in order to train new hires, to train those who missed the original training session, and to document the scope of training.

Typically, supervisors maintain training records for each employee under their supervision, although some departments have designated staff maintain the records. Training records should not be kept with personnel files and they need to be easily retrievable in case of a Labor and Industries (L&I) inspection. Training records should be kept as long as an individual employee is working in that job, and may be retained longer if there is a chance the employee may return to that job.

Suggested training documentation examples show ways to track training by class or subject (Appendix E. Chemical Safety Training Log [Chemical_Safety_Training_Log.doc](#)), or by individual trainee (Appendix F. UW Laboratory Employee Safety Training Checklist [Laboratory_Employee_Safety_Training_Checklist.doc](#) for chemical laboratory staff or Appendix G. Employee Chemical Safety Training Checklist (Non-Lab) [Non-Lab_Employee_Chemical_Training_Checklist.doc](#) for personnel in work areas other than chemical laboratories).

9. PROVIDING AN MSDS / SDS AND LABEL FOR A UW-SYNTHEZIZED CHEMICAL

Departments and supervisors must, if synthesizing a hazardous chemical and providing it to other labs outside the UW system, or if transporting a synthesized chemical over public streets, generate the Material Safety Data Sheet (MSDS) and generate a label. If providing it to agencies in countries which enforce the Globally Harmonized System of Classification and Labelling of Chemical Substances (GHS), the department and supervisor providing the chemical must generate a Safety Data Sheet (SDS) and label in accordance with that system. Before shipping or transporting the chemical,

Washington Administrative Code (WAC) 296-839 and WAC 296-828 require that if you provide chemicals to agencies outside your employer's units, the organization producing a hazardous chemical needs to identify any known hazards of the chemical, label the chemical container, and provide required information to the receiving lab in the form of an MSDS (or SDS). There is no *de minimus* quantity exemption even if the chemical will only be used as a research chemical by the recipient. Although some scientific data may not be available, the person producing the chemical still has the most relevant information about the chemical and its hazards, and that information needs to be formally passed along to the recipient.

For advice concerning completing this requirement, please send an email to uwcho@uw.edu or contact EH&S at 206-543-7388.

10. HAZCOM INVOLVING CONTRACTORS

You Need to Inform Contractors You Hire of UW Hazardous Materials Contractors must be informed of hazardous chemicals present from UW activities which may result in exposures to the contractor's employees. The University is responsible for any hazardous chemical exposures to contractors generated by UW activities, but not those brought to the job by the contractor.

If you hire an outside contractor, you need to advise the contractor of any HazCom concerns. Normally, this advice is that the University's program is available on the web site <http://www.ehs.washington.edu/ohshazcom/index.shtml> and that the work area supervisor occupying the work area the contractor may need to enter is the contact point for information about any local procedures for labeling containers and about any chemical hazards due to on-going work area activities. Whenever possible, on-going UW activities that could cause an exposure to contractor personnel should be stopped before they arrive.

- With the assistance of EH&S, the Capital Projects Office will provide the necessary hazard communication information to the contractor through contract and purchase specifications. The affected department or organizational unit may need to answer questions and provide more specific hazard communication information as it relates to any on-site activities.
- For service contracts where vendor personnel are required to work in areas with possible hazardous chemical exposures, the requesting University department or organizational unit must indicate on the Purchase Requisition that these potential exposures exist, and must provide the name of a contact person for further information. The University Purchasing Department will notify the vendor that hazard communication information is available when placing service contracts.

Some areas are "restricted" with controlled access due to the presence of unusual hazards such as high radiation areas and magnetic field areas in the Medical Centers, and asbestos and polychlorinated biphenol (PCB) contaminated areas in different buildings. The University's contracting representative should coordinate access with the operational unit if the restriction of entry into the area is due to operations or due to a local condition such as a chemical spill by the occupants which had not been adequately cleaned. If the problem is a locked access into an asbestos-contaminated or PCB-contaminated area, coordinate with EH&S.

If the non-UW employer wants an MSDS for a presumed work area exposure caused by UW personnel, but the work area supervisor cannot provide it, the UW construction manager or project manager should contact EH&S.

Informing Contractors that They Must Inform UW of Their Hazardous Chemicals

Conversely, contractors must inform the University of processes or hazardous chemicals they bring onto the University sites which may result in exposures to our employees or that may cause the University to exceed Department of Homeland Security notification limits. The University representative should understand how the chemicals are to be used, and if there is any question as to whether the chemical may present special hazards or that university faculty, staff, students or visitors may be exposed to a potentially significant risk, the University representative should consult with EH&S (206-543-7388).

- Specifications addressing contractor and outside vendor work must include language that they are responsible for notifying the University of any hazardous products brought to the job site.
- Contractors must review the chemicals to be brought on site in light of the list of tracked chemicals developed by the Department of Homeland Security (full list at

http://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf

). If any of the listed chemicals are to be brought onto University property, the contractor shall advise the University of the total amount and the size of container(s) of the specified chemical using the Chemicals of Interest (COI) worksheet provided by the contracting office.

If the contractor intends to perform procedures that may result in injuries, fires, explosions, or even such things as odor complaints from adjacent occupants, the contractor should inform the University's contracting representative well in advance so the work can be well planned and any necessary precautions taken by the University to inform employees and to prevent or minimize exposures. This is also necessary if there is a potential for starting a fire while performing "hot work" such as welding or cutting metal with a torch.

11. HAZCOM REGULATORY INFORMATION

Washington Administrative Code (WAC) 296-800-170 (Employer chemical hazard communication), WAC 296-828 (Hazardous chemicals in laboratories), and WAC 296-839 (Material safety data sheet and label preparation) set the basic requirements for a chemical hazard communication program (HazCom). The University of Washington program is mandated in Administrative Policy Statement (APS) 12.5, Chemical Hazard Communication.

WAC 296-800-140 (Accident prevention program) requires that training about chemical hazards must be effective. WAC 296-800-160 (Personal protective equipment) also requires training if personal protective equipment (PPE) is used to protect from chemical exposures. WAC 296-802 (Employee medical and exposure records) requires informing workers annually about their access to medical records and chemical exposure monitoring records.

Requirements that force the University to track chemical inventories with a centralized system are found in:

- The Bothell/Seattle/Tacoma Fire Codes,
- The congressional act Emergency Planning and Community Right-to-Know Act (EPCRA) (40 CFR Parts 355 and 370) found in the Superfund Amendments and Reauthorization Act (SARA), Title 3, and,
- The United States Department of Homeland Security requirements, which are at 6 CFR Part 27, promulgated as the Chemical Facility Anti-Terrorism Standards (CFATS).

There are also several individual chemical regulations (as of 5/10/10) that have chemical hazard communication requirements, typically if the chemical's airborne levels in the workplace exceed some limit set by the regulation:

- WAC 296-62-073 through -07316 (Carcinogens: 4-Nitrobiphenyl, Alpha-Naphthylamine, 4,4'-Methylene bis (2-chloroaniline), Methyl chloromethyl ether, 3,3'-Dichlorobenzidine (and its salts), Bis-Chloromethyl ether, Beta-Naphthylamine, Benzidine, 4-Aminodiphenyl, Ethyleneimine, Beta-Propiolactone, 2-Acetylaminofluorene, 4-Dimethylaminoazobenzene, N-Nitrosodimethylamine),
- WAC 296-62-07329 (Vinyl chloride),
- WAC 296-62-07336 through -07340 (Acrylonitrile),
- WAC 296-62-07342 through -07346 (1,2-Dibromo-3-chloropropane),
- WAC 296-62-07373 (Communication of ethylene oxide hazards to employees),
- WAC 296-62-07425 (Communication of cadmium hazards to employees),
- WAC 296-62-07460 (Butadiene),
- WAC 296-62-07470 (Methylene chloride),
- WAC 296-62-07519 (Thiram),
- WAC 296-62-07521 (Lead),
- WAC 296-62-07621 (Communication of hazards to employees – Methylenedianiline),
- WAC 296-62-07722 (Asbestos, tremolite, anthophyllite and actinolite: Employee information and training),
- WAC 296-62-08025 (Communication of chromium (VI) hazards to employees),
- WAC 296-62-14533 (Cotton dust),

- WAC 296-62-20019 (Coke oven emissions: Employee information and training),
- WAC 296-67-025 (Process safety management of highly hazardous chemicals: Training),
- WAC 296-826-20010 (Anhydrous ammonia: Training),
- WAC 296-848-30005 (Arsenic: Training),
- WAC 296-849-11050 (Benzene: Training),
- WAC 296-855-20090 (Ethylene oxide: Training), and,
- WAC 296-856-20020 (Formaldehyde: Training).

Appendix A – HazCom Compliance Checklist

Begins on next page.



Environmental Health and Safety
UNIVERSITY of WASHINGTON

University of Washington Checklist for Compliance with the HazCom Standards					
Supervisor:			Date:		
School/Department:					
Organization/Lab/Shop/Office Name:					
Building:			Room Number(s):		
Please check "YES," "NO," or "NOT APPLICABLE" for each item. Comments may be written next to the question or at the end of the survey. Questions answered "NO" require corrective action.					
#	Y	N	N A	QUESTION / RESOURCE FOR GUIDANCE	REGULATORY CITATION
1				Have chemicals stored or used in your work area been checked to identify those which are hazardous? / Identifying Hazardous Chemicals	WAC 296-800-17010
An "office-like" work area may have consumer-type chemicals with no "hazardous" chemicals identified. If this represents your work area, much of the remainder of the checklist does not need to be completed. However, you must address assessing new tasks, training about the HazCom program, asbestos awareness and record-keeping. (Questions #22 – #27, and #48).					
2				Have hazardous chemicals been listed in MyChem or a local spreadsheet? / Tracking Hazardous Chemicals	WAC 296-800-17010, Local Fire Department Fire Code, 6 CFR Part 27, 40 CFR Parts 355 and 370
3				If a local spreadsheet is used, have procedures been set up with EH&S to transfer inventory information to MyChem? / Tracking Hazardous Chemicals	Local Fire Department Fire Code, 6 CFR Part 27, 40 CFR Parts 355 and 370
4				If a local spreadsheet is used, is the information transferred to the MyChem system in accordance with a schedule set in coordination with EH&S? / Tracking Hazardous Chemicals	UW Policy
5				Is the list of chemicals / inventory in MyChem checked annually to make sure it is current? / Tracking Hazardous Chemicals	UW Policy, WAC 296-800-17010
6				Has a system been set up for handling Material Safety Data Sheets (MSDSs) and Safety Data Sheets (SDSs) – either electronically or using paper copies – so that all employees have access to them when they are at work? / MSDSs/SDSs	WAC 296-800-17020, WAC 296-828-20020
7				Can all employees demonstrate that they can retrieve the MSDS/SDS for any chemical they may use? / MSDSs/SDSs	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20020
8				If paper MSDSs/SDSs are maintained, are they checked annually to ensure an MSDS is available for every hazardous chemical in the work area? / MSDSs/SDSs	UW Policy
9				If paper MSDSs/SDSs are maintained, are all MSDSs/SDSs more than 5 years old checked to verify that they are current? / MSDSs/SDSs	UW Policy
10				If an MSDSs/SDSs was received in your work that was not in the MyChem system, was a copy sent to EH&S? / MSDSs/SDSs	WAC 296-800-17015, WAC 296-828-20020
11				If any chemicals were received that did not have a legible label in English, were they returned to the supplier? / Container Labeling	WAC 296-800-17025

12			Are all containers holding chemicals labeled (if they are containerized for longer than the shift in which they were generated)? / Container Labeling	WAC 296-800-17025
13			Do all container labels identify the chemical name and its hazards? / Container Labeling	WAC 296-800-17025
14			Is there an effective method of identifying the contents and hazards of unusual containers, such as long runs of tubing, pipes, built-in containers, hidden reservoirs, etc. if those situations are present in the work area? / Container Labeling	WAC 296-800-17025
15			If peroxide-forming chemicals are present in the work area, are the containers labeled with the UoW Form 1716 warning label? / Container Labeling	UW Policy
16			If chemicals are present in the work place which are on the list of chemicals that require notification to the Department of Homeland Security before transporting, are they labeled with the appropriate warning sticker? / Container Labeling	UW Policy
17			Are NFPA 704 (diamond) signs posted at the doors of chemical laboratories and hazardous chemical storage rooms that require them? / Container Labeling	Local Fire Department Fire Code
18			Have all procedures involving chemicals which require use of personal protective equipment (PPE) such as eye protection and gloves been assessed and the PPE selected? / Documenting Safe Procedures	WAC 296-800-16005, WAC 296-828-20005
19			If in a chemical laboratory, are the PPE requirements noted in the Standard Operating Procedures (SOPs)? / Documenting Safe Procedures	WAC 296-828-20005
20			If in any type of work area other than a chemical laboratory, are PPE requirements documented on one or more Job Safety Analyses or Job Hazard Analyses (JSAs/JHAs)? / Documenting Safe Procedures	WAC 296-800-16010
21			Do all JHAs requiring PPE have the statement: "This document is the certification of hazard assessment for PPE for the workplace."? / Documenting Safe Procedures	WAC 296-800-16010
22			Are personnel aware of the need to assess new or unusual tasks for hazards and to document the procedures and PPE appropriately? / Documenting Safe Procedures	WAC 296-800-17005, WAC 296-828-20015
23			Have all work area employees completed general awareness training within the last 12 months concerning asbestos in UW facilities? / HazCom Training	WAC 296-62-07722, Washington State Labor and Industries Citation and Notice of Assessment Inspection #306648205
24			Is there a copy of the poster "UW Chemical Hazard Communication Program" on the work area's/department's safety bulletin board? / HazCom Training	UW APS 10.3.3
25			Have all employees been told about the UW HazCom program and been shown or been told about the UW HazCom poster? / HazCom Training	UW APS 10.3.3, WAC 296-800-17030
26			If the employees' only exposure to hazardous chemicals is minimal use of consumer products such as a marker pen, did the employees receive the brochure about office chemicals prior to using such items at the UW? / HazCom Training	UW Policy
27			If employees use consumer goods such as furniture polish, marking pens, etc. more than a consumer may use them, have the consumer goods been included in the HazCom program and the employees trained? / HazCom Training	WAC 296-800-170
28			If employees are or may be exposed to hazardous chemicals, have they received effective training before the time of their first exposure? / HazCom Training	WAC 296-800-14005, WAC 296-800-14020, WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20015

29			Have all employees potentially exposed to hazardous materials been trained to the point that they can identify which chemicals are hazardous? / HazCom Training	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20015
30			Have all employees potentially exposed to hazardous materials generated by work area processes (but not on the hazardous chemical inventory) been trained to the point that they can identify those processes and exposure situations? / HazCom Training	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20025
31			Have all employees potentially exposed to hazardous materials been trained as to methods and observations for detecting the release of the hazardous substances? / HazCom Training	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20015
32			Have all employees potentially exposed to hazardous materials been trained as to what are the physical and health hazards of the chemicals and processes in the work area? / HazCom Training	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20015
33			Have all employees potentially exposed to hazardous materials been trained as to the equipment, procedures and PPE to be used to protect from chemical exposures? / HazCom Training	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20015
34			Have all employees using or being exposed to hazardous materials been informed about the signs and symptoms of health effects which might arise from exposure to the work area chemicals? / HazCom Training	WAC 296-800-17030, WAC 296-800-17035, WAC 296-828-20015
35			Have all employees exposed to a hazardous chemical been informed that they can get a medical consultation at a UW Employee Health Clinic if they think the exposure may have caused some health effect? / HazCom Training	WAC 296-800-17030, WAC 296-828-20030
36			If in a chemical laboratory, have employees been trained about WAC 296-828, the use of the lab's Chemical Hygiene Plan including SOPs to describe safe procedures, the exposure limits for the chemicals in use, and where this information and other references can be found? / HazCom Training	WAC 296-828-20015
37			In other work areas (not chemical laboratories), have employees been trained about the HazCom requirements found in APS 12.5 and WAC 296-800-170 and where these references can be found? / HazCom Training	WAC 296-800-17030
38			Have employees been informed annually that EH&S maintains monitoring records and can help interpret results and applicable regulations and that they have a right to access these monitoring records? / HazCom Training	WAC 296-800-18010, WAC 296-802-30005
39			If the department or work unit maintains records of exposure monitoring, are employees informed annually that they have a right to access those monitoring records? / HazCom Training	WAC 296-802-30005
40			Have employees been informed annually that they have a right to access their medical records? / HazCom Training	WAC 296-802-30005
41			If personnel are exposed above a permissible exposure limit or action level, are they informed annually of the chemical's hazards and their required protective measures? / HazCom Training	Chemical-specific WAC
42			If use of PPE is required, have employees been trained to the point that they can demonstrate proficiency in selecting, donning, doffing, and disposing or maintaining the PPE and they know of any limitations in use? / HazCom Training	WAC 296-800-16025, WAC 296-828-20015
43			If PPE is required in order to enter a work area, even though those people are not expected to have any chemical exposure, have those employees been trained in proper donning, doffing and disposal procedures and their response in case of emergency? / HazCom Training	UW Policy
44			If chemicals are simply stored in an area without being used or dispensed from bulk containers, have employees been trained in recognizing an emergency situation (i.e., spill), what the hazards may be, and how to respond? / HazCom Training	WAC 296-800-17040
45			If chemicals are received with labels or the Safety Data Sheet supplied in accordance with the GHS (Globally Harmonized System for Classifying and Labelling), have employees handling and using the chemicals been trained as to the meaning of the labels and warnings? / HazCom Training	UW Policy

Appendix B – HazCom Training Categories

Categories of Chemical Hazards

- 1) Toxic Hazards ... Three questions to ask during the training session to put risks into perspective:
 - Which chemicals used are highly toxic, moderately toxic, or have low toxicity?
 - What pathway(s) (inhaled / ingested / skin or eye contact / injected) can cause exposure?
 - What are the potential exposures and their frequency (i.e., the possible doses)? Probably small and frequent during daily operations and large and infrequent if a spill.
- a) Toxic to the body as a whole
- b) Toxic to specific organs or body systems
- c) Irritants
- d) Allergens / Sensitizers
- e) Asphyxiants
- f) Carcinogens
- g) Reproductive / Developmental toxicants
- h) Chemicals of unknown toxicity, such as nanoparticles
- 2) Corrosive Hazards
- 3) Flammable Hazards
 - a) Flammable liquids / Vapor hazards
 - b) Flammable gases
 - c) Flammable solids
 - d) Combustible dusts
 - e) Oxygen-enriched atmospheres
 - f) Combustible materials that may feed a fire once it starts
- 4) Reactive and Explosive Hazards
 - a) Incompatible chemicals
 - b) Compounds that generate toxic gases
 - c) Oxidizers
 - d) Chemicals that can polymerize
 - e) Pyrophorics
 - f) Water reactive chemicals
 - g) Explosives
 - Nitrated compounds
 - Peroxides
 - Other explosives
 - Dusts
 - h) Explosive boiling

Categories of Physical Hazards

- 1) Extreme Pressures (Note: many authorities include explosive hazards here)
 - a) Compressed gases
 - b) High pressure reactions / Warming contained cryogenics / Heating contained liquids
 - c) Diving operations / Overpressurizations
 - d) Vacuum operations
- 2) Extreme Temperatures
 - a) Cold stress
 - b) Cryogenic operations / Handling frozen materials
 - c) Heat stress
 - d) Kiln, Oven or Autoclave operations / Handling hot materials
 - e) Heat produced by chemical reactions
- 3) Workplace Conditions
 - a) Cuts
 - b) Slips, trips, falls
 - c) Working at heights (on ladders, manlifts, tall structures, etc.)

- d) Lifting
- e) Ergonomic / Repetitive stresses
- f) Noise
- g) Vibration
- h) Electrical hazards
- i) Equipment that moves / rotates / can fall from heights onto people / etc.
- j) Confined spaces (entering wells / spaces through hatches, etc.)
- k) Working in coldroom / environmental chamber with no outside air supply
- l) Lockout/Tagout concerns when equipment must be maintained while energized
- m) Workplace stress / Individual medical conditions / Violence issues
- n) Facility conditions (Asbestos, Lead, Poor water quality, etc.)

Radiological Hazards

Refer to training requirements in the Radiation Safety Program

Biological Hazards

Refer to training requirements in the Biological Safety Program

JOB SAFETY ANALYSIS FORM

University of Washington Department: <u>Dept. of Animal Research.</u> Task: <u>Clean Cage Washer Filters</u> Bldg., Room: <u>Moselle Hall, 333, 341</u> Job, Shift: <u>Animal Tech 2,3, Lead, All</u> Date: <u>June 30, 2009</u> Prepared by: <u>John Smallwood</u> Page: <u>1</u> of: <u>2</u>
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This document is the certification of the hazard assessment for PPE for the workplace.

Task Steps:	Equip./ Tools/ Chem.'s:	Hazards:	Controls:	Training:
1.Remove 4 metal floor grates (standing water beneath)	None	1. Lifting risk for musculoskeletal injury. 2. Potential for chemical/biological exposure from splash.	1. Use of teams to move grates 2. Rubber non-slip gloves for removing wet grates. Chemical splash goggles and waterproof apron and boots.	1. Lifting/ Back Protection 2. PPE Use
2. Remove 2 floor filters in front of the cage washer	None	1. Awkward positions 2. Splash hazard if filter dropped. Potential for chemical and/or biological exposures	1. Rest pauses between position changes and heavy lifting. 2. Chemical splash goggles, mask and face shield. Rubber gloves, boots and apron.	1. Lifting/ Back Protection 2. PPE Use
3.Hose off floor filters	Hose with nozzle	1. Splash hazard	1. Chemical splash goggles and face shield. Rubber gloves, boots and apron. N-95 respirator for aerosolized chemical and biological matter deposited on filters.	1. Respirator training and fit test

JOB SAFETY ANALYSIS FORM, Continued

University of Washington
 Department: Dept. of Animal Research.

Task: Clean Cage Washer Filters

Bldg., Room: Moselle Hall, 333, 341

Job, Shift: Animal Tech 2,3, Lead, All

Date: June 30, 2009

Prepared by: John Smallwood

Page: 2 of: 2

This document is the certification of the hazard assessment for PPE for the workplace.

Task Steps:	Equip./ Tools/ Chem.'s:	Hazards:	Controls:	Training:
4. Return filters and grates	None	1. Awkward positions 2. Lifting hazard → Musculoskeletal injury 3. Splash hazard	1. Rest pauses between position changes and heavy lifting. 2. Use of teams to move grates 3. Chemical splash goggles, mask and face shield. Rubber gloves, boots and apron.	1,2. Lifting/ Back Protection “ 3. PPE Use
5. Clean cage washer interior as needed	1. Hose use 2. Chemical use (JFQ Sur-Kleen)	1. Awkward positions 2. Chemical exposures	1. Rest pauses between position changes. 2. Chemical splash goggles and face shield. Rubber gloves, boots and apron. N-95 respirator for aerosolized chemicals.	1. Respirator training and fit testing 2. PPE Use, Hazardous chemical training

HINTS FOR CONDUCTING CHEMICAL SAFETY TRAINING

A major step in a successful HazCom program is assessing the hazards and safety methods and documenting the protections in Standard Operating Procedures (SOPs) or Job Hazard Analyses (JHAs). The next major step is communicating the safety information to your employees. Any style or format is acceptable for your training as long as all required elements are covered.

Training Class Formats

Decide on the style or format you will use for training employees – such as a group meeting or a one-on-one meeting. Some example training situations are:

- **Office Training.** If you are in an office with no real chemical use but employees did not receive a documented orientation to the HazCom program, the best approach probably would be to discuss the HazCom program during a general office meeting and document it. Make sure you follow up with anyone who missed the meeting. Cover the following points:
 - All workers have a right to know about the hazards of any chemicals they use and the safety precautions used to protect from those hazards,
 - The University's HazCom program is set up in APS 12.5 and the Environmental Health and Safety (EH&S) web pages, and all safety bulletin boards should contain a copy of the UW Chemical HazCom Program poster,
 - In an "office-type" environment where the only chemicals in use are consumer products such as glass cleaner or marking pens and they are used in the same manner that a typical consumer may use them, no additional training is needed, but
 - If anyone thinks they use consumer products extensively during work, please inform the supervisor so an additional evaluation can be performed. EH&S can provide advice.

- **Annual HazCom Program Training.** If employees work with hazardous chemicals, the best approach probably would be to discuss the annual training subjects during a general meeting, annually. (Annual awareness training about asbestos in UW facilities should be given on an individual basis either on-line or by attending a scheduled training session.) For the HazCom program training, make sure you inform anyone who missed the general meeting. Cover the following points:
 - All workers have a right to know about the hazards of the chemicals they use and the safety precautions used to protect from those hazards,
 - If anyone feels that they are having health effects due to their chemical exposure, they have a right to a consultation with a UW Employee Health Clinic and access to any medical records the University generates concerning their exposure, which should be available by contacting the clinic staff, and,
 - Employees have a right to access all records of monitoring of their chemical exposures that pertain to their work. These monitoring records may be kept by the work area itself if the monitoring was performed by the work area, or at EH&S if EH&S performed the monitoring. These records also include a list of hazardous chemicals in use, from the MyChem database.
 - If any airborne chemical level exceeds the limits given in pertinent regulations, inform workers about the health effects of the chemical, the protective measures presently in use, and the plan to reduce those levels.

- **Training about Several Chemicals with the Same Hazard.** If there has never been a documented training session for several chemicals that have the same hazard (such as “corrosives”), the best approach would be to schedule a safety meeting for all who will be affected. For several chemicals that have the same hazard, discuss the following points:
- What the hazard is (corrosive, flammable, etc.),
 - Which chemicals and processes have that hazard,
 - How to tell such chemicals have been released (odor, alarm, visible spill, visible chemical reaction, etc.)
 - What equipment, procedures, and PPE must be used to protect themselves from the hazard (including how to check that equipment is operating properly), and,
 - What the signs and symptoms of exposure can be – such as coughing, headaches, feeling of throat irritation, immediate or delayed pain, medical conditions that could develop.

NOTE: If you can, physically operate or demonstrate specific items such as what alarms sound like, finding the emergency eye wash/shower with eyes closed, and where a spill kit is located and what is in it.

- **Training on Personal Protective Equipment (PPE).** If there has never been a documented training session for PPE in general, the best approach would be to schedule a safety meeting for all who will be affected. Requirements for PPE training include discussing and demonstrating the following items – how to:
- Select the correct PPE for the task – that is, how to know what PPE is required for which tasks,
 - Inspect the PPE before putting it on,
 - Don it (put it on) correctly,
 - Know what the limitations of the PPE are – what problems might come up while wearing it,
 - Doff it (take it off) without contaminating yourself or the work area, and
 - Dispose of it properly (if disposable) or store it and maintain it properly (if reusable).

- **New Hazard Training.** If there has never been a documented training session for a particular process or hazard, if significant changes have been made to previous procedures, or if a new type of chemical or physical hazard is being introduced into the laboratory, the best approach would be to schedule a safety meeting for all who will be affected. Cover the same points as shown above in the section about “Training about Several Chemicals with the Same Hazard.”

Care must be taken that all elements required for training are addressed. If the process involves an extremely hazardous chemical, there are even more elements to cover than for a less hazardous chemical. Extremely hazardous chemicals are defined in Appendix H of the UW Laboratory Safety Manual

(<http://www.ehs.washington.edu/manuals/lsm/lsmh.pdf>), for non-lab work areas as well as laboratory work areas. The elements that need to be covered are:

- What chemicals are involved in the process and what the hazards are (carcinogen, extremely toxic, extremely water-reactive, etc.),
- How to tell if any chemicals have been released (odor, alarm, visible spill, visible chemical reaction, etc.)
- What equipment, procedures, and PPE must be used to protect themselves from the hazards (including how to check that equipment is operating properly), and, if an extremely hazardous material is involved, consider practicing the procedures using non-hazardous surrogate materials,
- What the signs and symptoms of exposure can be – such as coughing, headaches, feeling of throat irritation, immediate or delayed pain, medical conditions that could develop, and

- If an extremely hazardous material is involved, make sure decontamination and disposal requirements are well defined, identify the “restricted area” that sets the limits for the process work area, inform those doing the process to limit entry into the restricted area to only those directly involved but that there should be at least two people present during the process to help each other in case of emergency, and make sure the training is well documented. People should not be allowed to perform such tasks until they have completed the training and been approved to conduct the procedure.
- **New Employee Training.** Training presented in one-on-one meetings with employees or as part of individual on-the-job training is often done for new employees or for employees changing their duties. Co-workers may provide such training. Document that the employee showed proficiency for all the steps of the procedure and have the person sign off on the training record.

Methods

Consider using some of the suggested approaches given below:

Assign specific topics to different members of your staff to research and present to the rest of the staff. This can include researching the hazards, signs and symptoms of exposure, and personal protective equipment required, and writing draft SOPs/JHAs. Review and approve the materials before the class is given.

Research all available information, including:

- Material Safety Data Sheets (MSDSs),
- Chemical-specific regulations (which can be found by checking the Permissible Exposure Limit chart at <http://apps.leg.wa.gov/WAC/default.aspx?cite=296-841-20025>),
- Procedural manuals, equipment manuals, procedural web pages from similar work units, SOPs/JHAs, and,
- Any other available reference materials. These reference materials may be available on the web (although such a reference may not be peer reviewed), in office libraries, in departmental libraries, at EH&S and at University libraries.

Occasionally, you can obtain materials from a work unit that has similar chemicals, equipment, processes, and hazards. Review the material prior to the class to make sure it is accurate for your circumstances.

Consider whether everyone should read pertinent materials prior to a general meeting.

During the general meeting, discuss the information and provide an opportunity for questions. If materials handed out are well written, they may not need much elaboration during the meeting. Unfortunately, many documents are not well written or are missing vital information, such as neglecting some of the hazards involved, not describing signs and symptoms of exposure, being vague about what PPE is required at different stages of the process, not mentioning the step of checking equipment to make sure it is operating properly, or not mentioning the different methods available for detecting the presence or release of hazardous chemicals.

If a class is developed, you should save the training materials and use them when training new employees or people who missed the regular class.

Training must be “face-to-face” – handing out printed material alone does not qualify as effective training.

Your training and education program should be a regular, continuing activity – not simply a one-time or annual presentation.

Trainer Resources

EH&S provides various general safety classes to the campus community. Information and registration is available on-line at <http://www.ehs.washington.edu> for classes periodically scheduled or to leave a request for a special class. Information about other classes is also available by contacting the EH&S training staff, at 206-543-7201.

EH&S has several videotapes and handout materials that you can use in your training program (call 206-543-7201).

Documentation

Documentation of this training is an important part of demonstrating compliance. It is recommended that employees sign a form that describes the training they received. Suggested training documentation examples show ways to track training by class or subject (Chemical_Safety_Training_Log.doc), or by individual trainee (Laboratory_Employee_Training_Checklist.doc for chemical laboratory staff or Non-Lab_Employee_Training_Checklist.doc for personnel in work areas other than chemical laboratories).

EH&S keeps permanent records of attendance for all EH&S sponsored courses. Certificates of training are issued to individuals upon request.

UW Laboratory Employee Safety Training Checklist

According to state/federal laws and University of Washington policy, Principal Investigators and laboratory supervisors are responsible for ensuring that all employees receive adequate training to understand the hazards present in their work area. (This includes administrative personnel who handle lab chemicals for such tasks as receiving, inventory, stocking labs, etc.) Training must occur prior to assignments involving potential exposure to chemicals. EH&S provides general training for most categories of hazards in the laboratory. EH&S strongly encourages and in some cases requires that employees take these classes since they cover topics that are specific to the University of Washington and Washington state. (Laboratory staff must also receive training applicable to all UW employees such as an orientation to the department Health and Safety Plan, Emergency Evacuation and Operations Plan, etc.)

Employee Name: _____ **Date:** _____

Supervisor Name: _____ **Date:** _____

Laboratory-Specific Training by the Laboratory P.I., Manager, or Chemical Hygiene Officer		
<i>The below types of training are required for each laboratory staff person. Details about each subject are discussed in Section 7 of the UW Laboratory Safety Manual, online at http://www.ehs.washington.edu/manuals/lsm/index.shtm .</i>		
Have you received the following?		Date
Orientation to the Chemical Hygiene Plan (content and location), including: <ul style="list-style-type: none"> • UW Laboratory Safety Manual • Lab-specific Standard Operating Procedures (SOPs) • Other lab-specific information 	<input type="checkbox"/> YES	
Methods for finding exposure limits	<input type="checkbox"/> YES	
Material Safety Data Sheets (MSDSs) and other safety references	<input type="checkbox"/> YES	
The hazards of the workplace and how to detect the presence or release of hazardous chemicals and the basic signs and symptoms of chemical overexposure	<input type="checkbox"/> YES	
Requirements for Personal Protective Equipment (PPE) and how to select, don, doff, maintaining or disposing of it, and any limitations when using	<input type="checkbox"/> YES	
Proper disposal of all laboratory waste	<input type="checkbox"/> YES	
How to segregate and safely store chemicals in the laboratory	<input type="checkbox"/> YES	
How to safely clean up spills and respond to other emergencies	<input type="checkbox"/> YES	

EH&S Laboratory Safety Training Classes	
<i>Answer the following questions. If YES, fill in the date when the training is completed. For more information about the classes, see http://ehs.washington.edu/psotrain/index.shtm or contact the EH&S Training Office at ehstrain@u.washington.edu or 206.543.7201.</i>	
	Date
Are you responsible for chemical safety in your laboratory?	
<input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the Laboratory Safety Standard Compliance class.	
Do you work with hazardous chemicals?	
<input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the Managing Laboratory Chemicals class.	
Will you be maintaining your laboratory chemical inventory?	
<input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the MyChem class.	
Do you need to wear a respirator on the job?	
<input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, follow the instructions at: http://www.ehs.washington.edu/ohsresp/index.shtm . REQUIRED	

Do you work in an Animal Biological Safety Level-2 or Biological Safety Level-2 Laboratory?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, recommend taking the ABSL/BSL-2 class.
Are you planning to work in an Animal Biological Safety Level-3 or Biological Safety Level-3 Laboratory?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, contact the EH&S Research & Biosafety Office at 206.221.7770 additional training may be required. REQUIRED
Are you planning to work with Select Agents?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, contact the EH&S Research & Biosafety Office at 206.221.7770 additional training may be required. REQUIRED
Do you work with human cells, tissue or body fluids?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, take the Bloodborne Pathogens for Researchers class (initial and annually thereafter) REQUIRED
Are you planning to use ionizing radiation?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, follow the instructions at: http://www.ehs.washington.edu/rso/index.shtm . REQUIRED
Are you planning to use non-ionizing radiation?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, review the online information at: http://www.ehs.washington.edu/rsononion/index.shtm .
Do you package, ship, and/or transport hazardous materials or infectious substances?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, take the Shipping and Transporting Hazardous Materials class biannually. REQUIRED
Do you handle cylinders containing hazardous, toxic, and/or flammable compressed gases?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, you should take the Compressed Gas Safety class.
Have you volunteered to be one of the First Aid and CPR staff for your lab?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, take the First Aid and CPR Certification class.
Are you expected to use a fire extinguisher in the event of an emergency?	
<input type="checkbox"/> No <input type="checkbox"/> Yes	If Yes, take the Fire Extinguisher Training class annually. REQUIRED

Additional Specific Training as Needed

Use this section for any additional safety training needed in your laboratory due to "unusual hazards" (such as forklift operation, confined space entry, maintaining powered equipment [lockout/Tagout], working at heights [fall protection], lifting safety, Hydrofluoric acid, etc.).

After all of the training has been completed have the new employee sign and date this form and save it in your laboratory training records.

Employee Name: _____ Date: _____

UW Employee Chemical Safety Training Checklist (Non-Lab)

According to state/federal laws and University of Washington policy, supervisors are responsible for ensuring that all employees receive adequate training to understand the hazards present in their work area. Training must occur prior to assignments involving potential exposure to workplace hazards. EH&S provides general training for many categories of hazards. EH&S strongly encourages and in some cases requires that employees take these classes since they cover topics that are specific to the University of Washington and Washington state.

Employee Name: _____ **Date:** _____

Supervisor Name: _____ **Date:** _____

Chemical Training Provided by the Work Area to All Workers		
<i>The below types of training are required for each worker and are to be provided by knowledgeable personnel. Additional information is available in UW APS 10.3.3 (General Requirements for WISHA Compliance) and online at http://www.ehs.washington.edu/ohshazcom/index.shtm.</i>		
Have you received the following?		Date
Basic orientation to the workplace and potential chemical hazards, consisting of: <ul style="list-style-type: none"> • New Employee Orientation • Departmental or Unit Health and Safety Plan • Location of the UW Chemical Hazard Communication Program poster 	<input type="checkbox"/> YES	
Information that UW APS 12.5 (UW Chemical Hazard Communication Program) describes the program on your right to know about the hazardous chemicals you use	<input type="checkbox"/> YES	
If your only exposure to chemicals is to consumer products (such as pens, markers, furniture cleaner, etc.) and is no more frequent than a consumer might use the product, you should have received a copy of the brochure "UW Hazard Communication for Office and Computer Products"	<input type="checkbox"/> YES	

Specific Chemical Hazard Communication Training Provided by the Work Area		
<i>The below types of training are required for each worker using hazardous chemicals and are to be provided by knowledgeable personnel. Additional information is available in UW APS 10.4 (PPE) and APS 12.5 (Chemical Hazard Communication) and online at http://www.ehs.washington.edu/ohshazcom/index.shtm.</i>		
Have you received the following?		Date
Information about the hazardous chemicals and processes you may work with	<input type="checkbox"/> YES	
A session where you show that you can get the Material Safety Data Sheet (MSDS) for a chemical you will be working with	<input type="checkbox"/> YES	
Information about the hazards you may be exposed to, and how you may recognize those hazards either from labels, MSDSs, or training	<input type="checkbox"/> YES	
Knowledge about ways to tell if a chemical exposure could be occurring: <ul style="list-style-type: none"> • Warning sirens/monitoring systems in the workplace • From your senses (odor, hearing a hissing noise, seeing a spill, etc.) • Displaying symptoms or illnesses that may follow exposure to a chemical 	<input type="checkbox"/> YES	
Information about the procedures to be used to minimize chemical exposures	<input type="checkbox"/> YES	
Demonstration of the equipment (such as ventilation) required for the assigned tasks, and ways to check proper equipment operation before chemical use	<input type="checkbox"/> YES	
Identification of each work task requiring Personal Protective Equipment (PPE) and how to select, inspect, don, doff, and maintain the PPE properly	<input type="checkbox"/> YES	
Information about what chemical spills you may respond to, the location of spill cleanup materials and kits you may use, and the PPE you would need	<input type="checkbox"/> YES	

Information about the proper disposal of all waste chemicals	<input type="checkbox"/> YES	
Have you received training on: <ul style="list-style-type: none"> The UW Chemical Hazard Communication program in WAC 296-800-170, UW APS 12.5 and supporting EH&S web pages Available resources concerning chemical hazard controls (supervisor, job hazard analyses, EH&S, etc.) 	<input type="checkbox"/> YES	

EH&S-Provided Chemical Safety Training

Answer the following questions. If YES, fill in the date when the training is completed. For more information about the classes, see <http://www.ehs.washington.edu/psotrain/index.shtm> or contact the EH&S Training Office at ehstrain@u.washington.edu or 206.543.7201.

	Date
Do you work in or potentially enter any building that may contain asbestos? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the Asbestos Awareness class. REQUIRED ANNUAL *	
Will you be maintaining the chemical inventory for your work area? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the MyChem class.	
Do you need to wear a respirator on the job? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, follow the instructions at: http://www.ehs.washington.edu/ohsresp/index.shtm . REQUIRED	
Are you planning to work with Select Agents? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, contact the EH&S Research and Biosafety Office at 206.221.7770 additional training may be required. REQUIRED	
Do you package, ship, and/or transport hazardous chemicals? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the Shipping and Transporting Hazardous Materials class biannually. REQUIRED	
Do you handle cylinders containing hazardous, toxic, or flammable compressed gases? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, you should take the Compressed Gas Safety class.	
Have you volunteered to be one of the First Aid and CPR staff for your lab? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the First Aid and CPR Certification class.	
Are you expected to use a fire extinguisher in the event of an emergency? <input type="checkbox"/> No <input type="checkbox"/> Yes If Yes, take the Fire Extinguisher Training class annually. REQUIRED	

Additional Specific Training for Chemical Exposures

*Use this section for any additional training needed due to work task requirements such as more advanced asbestos training (*this supersedes general asbestos awareness training), lead training, confined space entry, hydrofluoric acid, the use of monitoring equipment, available from EH&S, or from contracted trainers.*

After all of the training has been completed have the new employee sign and date this form and save it in your laboratory training records.

Employee Name: _____ Date: _____