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University of Saint Francis

Hazard Communication Program

Introduction

The concept of informing employees about workplace hazards can be traced back to 1974. This is the year that the National Institute for Occupational Safety and Health (NIOSH) first recommended regulations of this type. The Occupational Safety and Health Administration (OSHA) enacted the Hazard Communication Standard, 29 CFR 1910.1200 in 1988, with a revision in 1994. The Standard requires that the hazards of all chemicals be evaluated and that the information concerning their hazards is transmitted to employers and employees. The regulation stipulates employers develop a hazard communication program that describes the methods used to convey this information to employees. The program must include the use of safety data sheets (SDS), labeling and employee training.

The USF written Hazard Communication (HazCom) Program describes the methods used to ensure employees are provided with the appropriate chemical hazard information. This program establishes responsibilities for departments, supervisors, and employees to accomplish this task. This document addresses only the general measures necessary to achieve compliance. Implementation of the program requires that each department, section, or group covered under this HazCom program develop a training plan that is specific for the chemical hazards encountered in that work area.

A fill-in-the-blank template for completing a department-specific plan is included in this document. To avoid repetition of information, the template does not include the same level of detail as the USF HazCom Program. The responsible supervisor will need to refer to the USF HazCom Program while preparing their Department Specific HazCom Plan to ensure compliance with all aspects of the program. Specialized terms used in the OSHA Standard and this HazCom Program documents are in a list of definitions (Appendix A).

Template for Unit-Specific Hazard Communication Plan (See Appendix C)

Purpose

The purpose of the USF HazCom Program is to ensure that all university employees who use hazardous chemicals are provided with information concerning those hazards. This written program describes in detail how information is transmitted to employees.

This program is designed to assist university departments, units, and working groups to meet the compliance requirements of the OSHA HazCom Standard.

Scope

This HazCom Program applies to all USF Departments, sections, and groups, as well as all employees at risk of occupational exposure to hazardous chemicals present in the workplace. The program applies to any hazardous chemical that is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.

Exemption: Chemical Laboratories are covered under the OSHA Laboratory Standard and are subject to the USF Chemical Hygiene Plan requirements, not HazCom requirements. Contact the Chemical Hygiene Officer at (ext. 8223) for additional information.

Program Responsibilities

University of Saint Francis

It is the responsibility of University of Saint Francis, as an employer, to take every reasonable precaution to provide a work environment that is free from recognizable hazards – whether chemical or physical. Therefore, USF fully supports this HazCom Program.

Risk and Safety Management Committee

The Risk and Safety Management Committee (RSMC) is responsible for the development and administration of the USF HazCom. The RSMC will:

- Serve as the university authority and source of information for the USF HazCom Program
- Develop and evaluate the written USF HazCom Program
- Develop and provide the USF HazCom training program
- Provide consultation, exposure evaluation, industrial hygiene surveys, workplace assessments or other services as needed or requested by departments or supervisors

Departments

Departments whose employees may be exposed to hazardous chemicals are responsible for providing the necessary and appropriate resources, including personnel, equipment and financial support to ensure a proper hazard communication plan is developed and implemented.

- Assign the Responsible Supervisor(s) for the effected area(s)
- Provide all necessary resources to implement an effective HazCom Plan. (i.e. storage for SDSs, labels, signs)
- Provide appropriate engineering controls as feasible. Conduct annual reviews to ensure that the HazCom plan is up to date and being effectively implemented
- Ensure continuity of recordkeeping, especially when supervisors leave or are reassigned.

Responsible Supervisors

The Responsible Supervisor (supervisor, foreman, project director, or manager) is ultimately responsible for ensuring that the department-specific HazCom plan is completed and is understood and followed by the employees under their charge. While the supervisor is *responsible* for implementing each of the elements described within the written HazCom Plan, it is permissible to delegate some *tasks* to other capable employees, provided the roles are clearly documented and understood.

- Complete the department-specific Hazard Communication Plan for their area and employees
- Identify and list in the chemical inventory all hazardous chemicals as defined under this program, used or generated in their work area and operations.
- Collect and maintain SDSs for each hazardous chemical used or created in the work area.
- Ensure all hazardous chemical containers are properly labeled
- Identify the employees who may be exposed to hazardous chemicals in their work area
- Provide appropriate protective measures including engineering controls and/or Personal Protective Equipment (PPE) for each employee
- Ensure that each of their employees receives HazCom training, consisting of both general and unit specific chemical hazard information; including non-routine work activities and emergencies
- Provide on-going training when new chemical hazards are introduced and when new employees may encounter chemical hazards

- Ensure employees are informed of chemical hazards they may encounter due to contractor(s) activities in the area, and inform contractors of chemical hazards they may encounter in USF facilities and/or on the university's campus
- Conduct ongoing work-site evaluations and recordkeeping reviews as necessary to ensure that the written plan is effectively implemented

Employees

All employees performing work with hazardous chemicals must accept responsibility for operating in a safe manner. Employees also have the responsibility to inform their supervisors of working conditions, accidents, work practices they believe hazardous to their health or health of others.

Employees are responsible for the following:

- Attending Hazard Communication training
- Using hazardous chemicals in accordance with instructions on the label and on the SDSs
- Labeling containers appropriately when transferring hazardous chemicals to secondary containers
- Practicing safe work habits
- Notifying their supervisor of unsafe conditions
- Evaluate the ongoing effectiveness of the Department Specific Hazard Communication plans

Chemical Inventory

The supervisor or designee is responsible for identifying and listing all hazardous chemicals, used or generated in their work area, in the chemical inventory.

The Chemical Inventory also serves as a list of all materials for which a SDS must be maintained, and is the initial step, necessary for completion of the rest of the program. Compiling the chemical inventory is not a one-time effort. Like all components of the HazCom plan, the inventory must be updated and maintained as SDSs are updated, chemicals are substituted or no longer used or new chemicals are brought on site. A Chemical Inventory Form is used to assist in completing and maintaining the Chemical Inventory.

Purchasing Policies

Purchases of chemical stock will be restricted to prescribed limits based on: (1) the maximum amount which can be safely stored, and (2) the minimum amount necessary for uninterrupted work.

Purchasing authority will be limited to a few designated responsible personnel.

Periodic Inventories

All chemical containers should be identified so older chemicals can be used before newer stock. Staff shall ensure that chemical inventories are maintained and up to date. Laboratories shall ensure that inventories are maintained for each lab and an updated list forwarded to the Risk & Safety Management Committee annually. The Safety and Security Department shall provide for waste disposal services.

Preparing the Chemical Inventory

An initial approach to prepare a chemical inventory is to survey the workplace. In developing the chemical inventory, identify hazardous chemicals in containers, including pipes, processing units, and tanks. The broadest possible perspective should be taken when doing the survey. Often "chemicals" are thought of as being only liquids

in containers. The HazCom program covers chemicals in all physical forms - liquids, solids, gases, vapors, fumes, and mists - whether they are "contained" or not. The hazardous nature of the chemical and the potential for exposure are the factors that determine whether a chemical is covered. If it's not hazardous, it's not covered. If there is no potential for exposure (e.g., the chemical is inextricably bound and cannot be released), the rule does not cover the chemical. If you have questions about specific items please contact the RSMC.

Contaminants generated in the workplace such as welding fumes (generated when welding metals) and dusts (sawing or sanding wood) are also potential sources of exposure, and must be listed on the chemical inventory.

Identifying Hazardous Chemicals in the Work Area

A key component of the hazard communication program is differentiating between hazardous and non-hazardous materials. The primary responsibility for evaluating hazards is placed on the manufacturers and importers who are required to evaluate the chemicals they produce or import by determining if the chemicals are physical or health hazards. If a chemical meets any of the criteria as a physical or health hazard, the manufacturer must **label** the container with hazard information.

Any chemical or product that has been determined by the manufacturer to be a hazardous chemical (i.e. label gives hazard warning information) must be included in the Chemical Inventory, unless it is exempt (see exempted materials list beginning on the next page).

Exempted Materials

The OSHA standard exempts a number of items, which therefore do not have to be included in the HazCom Plan nor be listed in the Chemical Inventory.

- Hazardous Waste (see the USF Hazardous Waste Plan for additional information)
- Any consumer product, which is used in the work place as intended by the manufacturer, and used in the same manner of a typical consumer.
- Articles, if under normal conditions of use it does not release more than minute or trace amounts of a hazardous chemical and does not pose a physical hazard or health risk to employees. (for example: stainless steel table, vinyl upholstery, tires, adhesive tape). Exposure estimates can be done mathematically, if the proper personnel perform those calculations.
- Wood or wood products which would not be processed (chemically treated wood that would be sawed or cut, generating dust and potential exposure, is not exempt)
- Food or alcoholic beverages, intended for retail sale or personal consumption
- Any drug when in solid final form, for direct administration to patients (pills, or tablets) or packaged for sale to consumers (e.g. over-the-counter drugs) and drugs intended for personal consumption
- Cosmetics, packaged for sale to consumers and cosmetics for personal use
- Tobacco or tobacco products
- Nuisance particulates (common dust)
- Ionizing and non-ionizing radiation
- Biological hazards

OSHA defines a hazardous chemical as any chemical that is a physical hazard or health hazard.

Physical Hazards

Physical hazard means a chemical this is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, and oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Health Hazards

Health hazard means any chemical that causes acute or chronic health effects in exposed employees. It includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, and neurotoxins, agents that act on the hematopoietic system and agents that damage the lungs, skin, eyes or mucous membranes.

Respiratory protection and/or adequate ventilation must always be used when working with paints. If in doubt, don't leave respiratory protection out.

The everyday common cleaning supplies must not be overlooked in a Right-To-Know compliance program. Hazardous substances are often used as ingredients in cleaning supplies. Although these chemicals may be safe used individually, they must be evaluated to ensure combinations do not create overexposure, or produce dangerous off-gassing.

Compressed gases must be managed to prevent accidental damage to the cylinder or the uncontrolled release of its gaseous contents. Uncontrolled releases of compressed gases can lead to asphyxiation, fire or explosion. Cylinders must be secured to walls or benches, and will not be moved without the valve protector in place.

General Information about Chemicals

Flammable Chemicals

All flammable chemicals will be stored away from ignition sources and protected from open flames, static discharge, cigarettes, and sparking tools. All bulk vessels containing flammable chemicals will be grounded in accordance with OSHA standards and National Fire Protection Association (NFPA) codes. Appropriate fire extinguishing material will be kept available for fire emergencies.

Corrosive Chemicals

All corrosive chemicals will be managed to prevent spills. Personnel using corrosive material will be protected with rubber gloves, face shield, goggles and other appropriate protective equipment. Acids and caustics will be stored away from each other. Corrosive chemicals utilized as pH neutralization systems for waste water shall be kept in secondary containment.

Toxic Chemicals

All toxic chemicals will be managed according to OSHA's guidelines, (Permissible Exposure Levels -PEL's), or the more strict American Conference of Governmental Industrial Hygienists (ACGIH) guidelines, (Toxic Limit Values - TLV's). Workers will be trained on the proper chemical handling methods and the appropriate personal protective equipment.

Reactive Chemicals

Chemicals which are incompatible with other chemicals will be segregated to avoid accidental chemical reactions. No mixing of reactive chemicals is allowed except under supervision.

No supervisor/faculty/assistant will allow chemical mixing to take place without first checking the containers label and checking the SDS to note special mixing hazards.

Oxidizers are chemicals which may react violently, explosively or generate sufficient heat to ignite when mixed with a flammable or combustible material. All oxidizer chemicals will be segregated from all flammable and combustible materials including solvents, cleaners, paint, rags, paper and wood. Personnel handling oxidizers will wear proper protective clothing and equipment.

Radioactive

The university does not maintain any radioactive chemicals or materials in its inventory to be handled by any student, staff or faculty member. The only radioactive material kept at the university is the source material used in the X-Ray machine for the Radiological Technician program in the School of Health Sciences.

University personnel do not maintain or repair the X-Ray machine. Several 3rd party parties are contracted to perform all preventive and corrective maintenance on the university's X-Ray machine.

Other

Paint and painting supplies often contain a variety of hazardous substances such as flammable solvents and toxic ingredients. Organic paints and paint thinners often contain flammable solvents which must be managed as other flammable chemicals. Aerosol sprays and epoxy resins sometimes contain toxic substances, including toluene diisocyanates, and must therefore be scrutinized when the paint is initially purchased to determine whether it contains toxics and how it is best applied.

Safety Data Sheets (SDS)

The supervisor or designee will ensure that all SDSs are available for every hazardous chemical used in the work area and are available to employees on all work shifts.

The supervisor or designee will determine the method used to organize, store, and maintain the SDSs as described in the unit-specific plan.

- Current SDSs are maintained and are checked regularly (minimum is annual) to ensure there is a corresponding and current SDS for each chemical on the Chemical Inventory
- If there are SDSs for chemicals that are not on the Chemical Inventory, or the reciprocal, the supervisor or designee will determine the reason for the discrepancy (i.e. the chemical is no longer used, chemical overlooked during inventory) and take the necessary corrective action
- An SDS must be provided with or prior to the initial shipment of any hazardous substance and with or before a shipment for which an SDS has been updated
- If an SDS is needed from the supplier, the supervisor or designee will contact the supplier and request the missing SDS be sent via e-mail, fax or regular mail.
- When an SDS is received, review it for changes in health and safety information, notify employees of changes as needed, file and add to Chemical Inventory as appropriate
- Store old SDSs for chemicals that are no longer in use or no longer present in the work area in an archive file, indicating the dates the material was used.

SDSs can be in any format, as long as all of the required information is included, and must be in English. This requirement does not prevent a chemical manufacturer or employer from translating SDSs from English into other languages, in order to assist non-English speaking employees with training, comprehension and hazard recognition.

SDSs must contain the following information:

Section 1.	Identification (Name, CAS, manufacturer (including contact information))
Section 2.	Hazard Identification (GHS pictogram, precautionary statements, etc.)
Section 3.	Composition/ information on ingredients
Section 4.	First aid measures
Section 5.	Firefighting measures (NFPA)
Section 6.	Accidental release measures
Section 7.	Handling and storage
Section 8.	Exposure controls, personal protection
Section 9.	Physical and chemical properties (vapor, pressure, flash point and color)
Section 10.	Stability and reactivity
Section 11.	Toxicological information, including signs and symptoms of exposure OSHA (PELs), the threshold limit value (TLVs)
Section 12.	Ecological information*
Section 13.	Disposal consideration*
Section 14.	Transportation information*
Section 15.	Regulatory information*
Section 16.	Other information

***Note: since other Agencies regulate this information OSHA will not be enforcing Sections 12 through 15 (29 CFR 1920.1200(g)(2)).**

Employees are not to use any hazardous chemical until an SDS is obtained, and they have been instructed in the chemicals hazards and safe handling methods.

An SDS contains very technical information. Moreover, it is essential that the supervisor understand the significant information about each chemical to ensure employees are provided appropriate information for the safe handling and use to reduce the risk of chemical exposure. The School of Arts and Sciences has personnel that are qualified to help supervisors understand the information contained on an SDS.

Some suppliers provide SDSs for non-hazardous products; however, these SDSs do not need to be maintained, but may be advisable, to document the absence of hazardous components.

If a sales person supplies a sample of a hazardous chemical product, the container must be labeled, an SDS must accompany the product if the product is used, and it should be listed on the chemical inventory.

Labels

Labels provide an immediate warning of the hazards which employees may be exposed and provide a link to more detailed information (i.e. SDS).

OSHA requires that all hazardous chemicals be labeled appropriately to convey the appropriate hazard information to employees. It is the responsibility of the manufacturer or importer to ensure that information is accurate. The responsible supervisor or the designee must ensure these containers are properly labeled when they arrive on site and that they remain so throughout their use.

The University of Saint Francis will use and preserve the labels already on containers provided by the chemical manufactures or suppliers. Whenever any materials are transferred to other containers for later use, the new container will be labeled immediately. The supervisor or designee will ensure that every container entering the work site bears the required label. The label must include the:

- Identity of the chemical

- Appropriate hazard warnings, including target organ effects
- Name and address of the manufacturer, importer or distributor

Hazard Warnings

Hazard warnings on labels may consist of words, pictures, symbols, or a combination thereof, which provide the specific physical or health hazards, including target organ effects, of the chemicals in the container.

Never work with a chemical until you understand the potential hazards and know how to handle it safely

The label is intended to be an immediate visual reminder of the hazards of the chemical in the container. It is not necessary that every hazard presented by a chemical be listed on the label. The SDS is used for this purpose.

Products that are subject to EPA regulations (i.e. insecticides, fungicides, rodenticides, and disinfectants) and FDA regulations (i.e. food, food additives and drugs) must be labeled according to those agencies regulations. There is no need to re-label these containers for Hazard Communication compliance.

Primary Containers

The primary information to be obtained from an OSHA-required label is an identity (name) for the material, and appropriate hazard warnings. The identity is any term that appears on the label, the SDS and the list of chemicals, and thus links these three sources of information. The identity used by the supplier may be a common or trade name ("Joe's Formula 13"), or a chemical name (Acetone). The hazard warning is a brief statement of the hazardous effects of the chemical ("flammable," "causes lung damage"). Labels frequently contain other information, such as precautionary measures ("do not use near open flame"), but this information is provided voluntarily and is not required by the rule. Labels must be legible, and prominently displayed. There are no specific requirements for size or color, or any specified text.

Secondary Containers

If any chemical is transferred to another container, the new or secondary container must be labeled. The label on the secondary container must contain the same information required for the label on the original container. There are several acceptable methods to label a secondary container:

- Applying a photocopy of the original label to the secondary container
- Applying a duplicate label provided by the manufacturer
- Applying a legible handwritten label

Secondary Labeling Exemption

It is not necessary to label the secondary container if the employee who performs the transfer is the *only person* who uses the chemical from the new container, during their work shift.

However, it is highly recommended that all containers be labeled to avoid confusion and possible harm to employees. This recommendation includes non-hazardous chemicals as well. For example, an unlabeled container of distilled water may look similar to a container of Isopropyl Alcohol, and labeling in this instance would be clearly helpful in distinguishing the two.

In situations where a tank truck, rail car or similar vehicle comprises the container for a hazardous chemical, the labeling information may be posted on the outside of the vehicle or attached to the accompanying shipping papers or bill-of-landing. A label may not be sent separately, even if prior to shipment.

In-house containers such as pipes, storage tanks and process vessels containing hazardous chemicals must also be labeled. Alternative labeling systems can be used, as long as it is readily available to the employees in the area throughout each work shift. This does not include SDSs in lieu of labels.

Other forms of labeling include:

- Signs
- Placards
- Process Sheets
- Batch Tickets
- Operating Procedures

Understanding the Hazards / Hazard Determination

The manufacturer or importer of a chemical must determine if the chemical product is hazardous under OSHA's HAZCOM. The University is not responsible for testing any purchased materials to determine hazard properties; however, University personnel will be aware of minimal hazard determination procedures:

The DOT hazard class labels on the containers must coincide with the hazards described on the SDS. (e.g. if the SDS says that the material is not hazardous, but the Department of Transportation (DOT) shipping label is poison, the supplier must be contacted to clear the discrepancy).

If experience has shown the material to have a different hazard than stated on the SDS, then the supplier must be contacted for explanation and clarification.

If the SDS states that the ingredients are a trade secret but gives no hazard warnings or first aid information, then the supplier must provide a new and more complete SDS.

Non-Routine Tasks and Emergencies Involving Hazardous Chemicals

Periodically employees may be required to perform non-routine tasks (e.g., infrequent cleaning operations, maintenance activities, special projects, etc.) in which they may encounter hazardous chemicals.

Prior to the start of a non-routine project, the supervisor or designee will provide training for each effected employee, including specific hazards of the materials that he or she may encounter during the activity. The hazard information will include protective measures the employee can use such as PPE, and what safety measures may be used including ventilation, air monitoring, buddy systems, emergency rescue procedures, confined space entry procedures.

Supervisors should plan for foreseeable emergencies (e.g. spills, fires, power outages, etc.) and train employees on the appropriate actions.

Working with Contractors

Outside contractors are utilized by many USF departments for a variety of activities including: construction, renovation, testing and maintenance. There is a reciprocal responsibility between USF and the contractor to fulfill the requirements of the Hazard Communication Standard.

The USF employee who coordinates/oversees the work of a contractor must advise the contractors of their responsibility to provide appropriate hazard information (SDSs) for all hazardous chemicals brought onto university property.

Likewise, it is the responsibility of that individual to provide the contractor with information about the hazardous substances to which they may be exposed while at a USF site and if applicable, the labeling system in use, protective measures to be taken, safe handling procedures, and the location and availability of SDSs.

Whenever possible, the best possible situation is to eliminate the risks of exposing outside workers to hazardous chemicals. This can be accomplished by disposal or relocation of unwanted material to a safe area away from the construction renovation site. When these options are not available, the university manager or project coordinator (or the manager of construction and renovation projects) will be responsible for informing the outside service about the requirements of this Program.

Compliance must be documented in writing and shall include:

1. The contracted employer must be made aware of the possibilities of exposure to hazardous chemicals on the work site. The university's manager of the area in question is the best resource person for consulting exposures.
2. Any necessary precautionary measures to be used on the work site must be communicated to outside employers.
3. Outside employers must be informed of the availability and location of SDS.
4. SDSs for all hazardous substances brought onsite by outside employers must be acquired, with copies being submitted to the work site manager and the Safety and Security Department for review and action.
5. Outside employers must be required, as a condition of the work agreement, to abide by all University safety rules, and follow the requirements of this Hazard Communication Program.

Building-Related Hazards

Contractors and Physical Plant personnel perform the majority of renovation work in university owned buildings. However, employees in other units may also need to disturb installed building materials for various purposes, so this information applies universally.

- **Asbestos**
 - Asbestos fibers were added to many building materials prior to the 1980's when some uses of asbestos were banned. Pipe insulation, floor tile, ceiling tile/board, drywall/joint compound, laboratory cabinet tops, transite board, glues, mastics and caulks are some of the more common building materials that may contain asbestos fibers. When left intact and undisturbed these materials do not pose a health risk to building occupants. If disturbed and inhaled in sufficient quantity, asbestos fibers may cause cancer and lung disease.
 - At USF, the Operations Department provides asbestos management and obtains abatement services. Before disturbing any suspect building materials contact Operations for asbestos testing.
- **Lead Based Paint** – Lead-based paint (LBP) may be present on surfaces in pre-1978 buildings. Although LBP chips can be a hazard to young children who eat the chips, the primary concern for adult exposure is

fine dust, where inhalation or accidental ingestion of lead dust in sufficient quantity can affect the blood or nervous system. Avoid disturbance of LBP that creates a fine dust (power sanding, saw cutting, etc.). If renovation of a painted surface may create fine dusts, contact Indiana Department of Environmental Management (IDEM) for LBP testing.

- **Silica** – Many building materials contain silica sand – cement, concrete, brick, mortar, etc. While sand particles themselves are not a hazard, very fine dusts of crystalline silica may cause lung disease. Although drilling a few holes does not create a significant hazard, extensive use of power tools on these materials must include dust control measures. In addition, there should be no dry sweeping of residual dusts and only vacuums cleaners with high efficiency filters may be used.

Training

Each employee who works with, or is potentially exposed to hazardous chemicals will receive initial and periodic training on the Hazard Communication Standard and the safe use of those hazardous chemicals.

The employee's supervisor or designee is responsible for ensuring that each employee receives the appropriate Hazard Communication training, including both general and unit-specific training and must maintain documentation of all training.

General Haz Com Training

Departments will provide General Hazard Communication training for employees, which will include the following topics:

- A summary and explanation of the OSHA Hazard Communication Standard, and an explanation of the USF Hazard Communication Plan, along with its location and availability
- The chemical and physical properties of hazardous materials (e.g. flash point, vapor pressure, reactivity) and the methods that can be used to detect the presence or release of chemicals
- The potential health hazards of chemicals (e.g. dermatitis, allergic reaction) and physical hazards of chemicals (e.g. potential for fire, explosion)
- Methods and observations to detect the presence or release of hazardous chemicals, such as monitoring conducted by RSMC, continuous monitoring devices, visual appearance or odor, etc.
- The precautions and procedures to protect against chemical hazards (e.g. engineering controls, such as ventilation; work practices, such as hand washing; personal protective equipment, such as gloves); and emergency procedures if exposed without warning
- Pre-planning for non-routine tasks, spills and emergencies
- The importance of SDSs and labels, accessibility, and how to read and interpret the information

Workplace-Specific Training (See Appendix C)

The supervisor must ensure all employees, those they supervise, as well as other employees working in the area under their supervision (i.e. employee from another department), are provided with the current hazard information for the chemicals that may be encountered.

The supervisor or the designee will conduct the unit- specific training focusing on the specific chemical hazards that employees may encounter. This training will be provided either before or at the time the employee is assigned to work with a hazardous chemical. Additional training shall be provided for employees whenever a new hazard is introduced into the work area. Department-Specific training will include, at a minimum:

- A review of the written department-specific Hazard Communication Plan

- Location & accessibility of the SDSs, chemical inventory, and written plans
- Details of the university's labeling system
- Hazards of the specific materials to which employees may be exposed
- Protective measures to reduce exposure including
 - PPE for use with hazardous chemicals (specific type, location, use, and maintenance)
 - Work practices
 - Location of Safety Showers/Eye Wash stations
- Explanation of routine and non-routine tasks involving encounters with hazardous chemicals
- Emergency procedures involving hazardous materials

An assortment of training on specialized health and safety topics is available to supervisors to supplement unit-specific training. Please contact RSMC for available training resources.

The Employee Training Form is used to document when each employee is trained as well as the content of the training. These are important compliance records and must be maintained by the supervisor or designee for the duration of employment of each individual receiving the training.

RSMC will periodically review the training program to ensure the material is current and appropriate for the existing conditions.

Recordkeeping

The Department must develop a plan to ensure the continuity of all recordkeeping when a supervisor leaves or is reassigned.

Training records: Records of General and Department Specific HazCom training must be maintained by the supervisor and be readily available for inspection by RSMC, EPA, or OSHA representatives.

SDS: The supervisor is responsible for the SDSs for hazardous material currently used in the work place, which must be maintained and updated as described in this Hazard Communication Program, and must be retained for 30 years (per the Access to Employee Exposure and Medical Records Standard 29 CFR 1910.1020). The 30-year retention is not required if the Chemical Inventory includes where and when the chemicals were used (Inspection Procedures for the Hazard Communication Standard).

Chemical Inventory: The Supervisor will ensure a list of hazardous material is current and accurately maintained. Each calendar year the supervisor will sign and date a copy thus confirming the accuracy of the information on the Chemical Inventory. A signed copy will be provided to RSMC upon request. A file of these annual chemical inventories will be maintained by the supervisor for 30 years.

Appendix A: Glossary of Chemical Terms

ACGIH - The American Conference of Governmental Industrial Hygienists is a voluntary membership organization of professional industrial hygiene personnel in governmental or educational institutions. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLV's) for hundreds of chemicals, physical agents, and biological exposure indices.

ACUTE - Short duration, rapidly changing conditions.

ACUTE EXPOSURE - An intense exposure over a relatively short period of time.

ANSI - The American National Standards Institute is a voluntary membership organization (run with private funding) that develops consensus standards nationally for a wide variety of devices and procedures.

ASPHYXIANT - A chemical (gas or vapor) that can cause death or unconsciousness by suffocation. Simple asphyxiants, such as nitrogen, either remove or displace oxygen in the air. They become especially dangerous in confined or enclosed spaces. Chemical asphyxiants, such as carbon monoxide and hydrogen sulfide, interfere with the body's ability to absorb or transport oxygen to the tissues.

BOILING POINT - The temperature at which the vapor pressure of a liquid equals atmospheric pressure or at which the liquid changes to a vapor. The boiling point is usually expressed in degrees Fahrenheit. If a flammable material has a low boiling point, it indicates a special fire hazard.

"C" OR CEILING - A description usually seen in connection with ACGIH exposure limits. It refers to the concentration that should not be exceeded, even for an instant. It may be written as TLV-C or Threshold Limit Value-Ceiling. (See also THRESHOLD LIMIT VALUE).

CARCINOGEN - A substance or physical agent that may cause cancer in animals or humans.

C.A.S. NUMBER - Identifies a particular chemical by the Chemical Abstracts Service, a service of the American Chemical Society that indexes and compiles abstracts of worldwide chemical literature called Chemical Abstracts.

cc - Cubic centimeter, a volumetric measurement which is also equal to one milliliter (ml).

CHEMICAL - As broadly applied to the chemical industry, an element or a compound produced by chemical reactions on a large scale for either direct industrial and consumer use or for reaction with other chemicals.

CHEMICAL REACTION - A change in the arrangement of atoms or molecules to yield substances of different composition and properties. (see REACTIVITY)

CHRONIC - Persistent, prolonged or repeated conditions.

CHRONIC EXPOSURE - A prolonged exposure occurring over a period of days, weeks, or years.

COMBUSTIBLE - According to the DOT and NFPA, combustible liquids are those having a flash point at or above 100°F (37.8°C), or liquids that will burn. They do not ignite as easily as flammable liquids. However, combustible liquids can be ignited under certain circumstances, and must be handled with caution. Substances such as wood, paper, etc., are termed "Ordinary Combustibles".

CONCENTRATION - The relative amount of a material in combination with another material. For example, 5 parts of (acetone) per million (parts of air).

CORROSIVE - A substance that, according to the DOT, causes visible destruction or permanent changes in human skin tissue at the site of contact or is highly corrosive to steel.

CUBIC METER (m³ or M³) - A measure of volume in the metric system; measures 1M by 1M by 1M.

CUTANEOUS - Pertaining to or affecting the skin.

DECOMPOSITION - The breakdown of a chemical or substance into different parts or simpler compounds. Decomposition can occur due to heat, chemical reaction, decay, etc.

DERMAL - Pertaining to or affecting the skin.

DERMATITIS - An inflammation of the skin.

DILUTION VENTILATION - See **GENERAL VENTILATION**.

DOT - The United States Department of Transportation is the federal agency that regulates the labeling and transportation of hazardous materials.

DYSPNEA - Shortness of breath; difficult or labored breathing.

EPA - The Environmental Protection Agency is the governmental agency responsible for administration of laws to control and/or reduce pollution of air, water, and land systems.

EPA NUMBER - The number assigned to chemicals regulated by the Environmental Protection Agency (EPA).

EPIDEMIOLOGY - The study of disease in human populations.

ERYTHEMA - A reddening of the skin.

EVAPORATION RATE - The rate at which a material is converted to vapor (evaporates) at a given temperature and pressure when compared to the evaporation rate of a given substance. Health and fire hazard evaluations of materials involve consideration of evaporation rates as one aspect of the evaluation.

°F - Degrees, Fahrenheit; a temperature scale.

FLAMMABLE LIQUID - According to the DOT and NFPA a flammable liquid is one that has a flash point below 100°F. (See **FLASH POINT**)

Classes Of Flammable Liquids		
Flammable Solvent Class	Boiling Point	Flash Point
Class 1A	<100°F	<73°F
Class 1B	>= 100°F	<73°F
Class 1C	>= 100°F	Between 73 and 100°F

FLASH POINT - The lowest temperature at which a liquid gives off enough vapor to form an ignitable mixture with air and burn when a source of ignition (sparks, open flames, cigarettes, etc.) is present. Two tests are used to determine the flash point: open cup and closed cup. The test method is indicated on the SDS after the flash point.

GENERAL VENTILATION - Also known as general exhaust ventilation, this is a system of ventilation consisting of either natural or mechanically induced fresh air movements to mix with and dilute contaminants in the workroom air. This is not the recommended type of ventilation to control contaminants that are highly toxic, when there may be corrosion problems from the contaminant, when the worker is close to where the contaminant is being

generated, and where fire or explosion hazards are generated close to sources of ignition (See LOCAL EXHAUST VENTILATION).

g/Kg - See GRAMS PER KILOGRAM.

GRAM (g) - A metric unit of weight. One ounce equals 28.4 grams.

GRAMS PER KILOGRAM (g/Kg) - This indicates the dose of a substance given to test animals in toxicity studies. For example, a dose may be 2 grams (of substance) per kilogram of body weight (of the experimental animal).

HAZARDOUS MATERIAL - Any substance or compound that has the capability of producing adverse effects on the health and safety of humans.

IGNITABLE - A solid, liquid or compressed gas that has a flash point of less than 140°F. Ignitable material may be regulated by the EPA as a hazardous waste, as well.

INCOMPATIBLE - The term applied to two substances to indicate that one material cannot be mixed with the other without the possibility of a dangerous reaction.

INGESTION - Taking a substance into the body through the mouth, such as food, drink, medicine, or unknowingly as in contaminated hands or cigarettes, etc.

INHALATION - Breathing in of an airborne substance that may be in the form of gases, fumes, mists, vapors, dusts, or aerosols.

INHIBITOR - A substance that is added to another to prevent or slow down an unwanted reaction or change.

IRRITANT - A substance that produces an irritating effect when it contacts skin, eyes, nose, or respiratory system.

KILOGRAM (Kg) - A unit of weight in the metric system equal to 2.2 pounds.

LC₅₀- See LETHAL CONCENTRATION₅₀.

LD₅₀- See LETHAL DOSE₅₀.

LETHAL CONCENTRATION₅₀ - The concentration of an air contaminant (**LC₅₀**) that will kill 50 percent of the test animals in a group during a single exposure.

LETHAL DOSE₅₀ - The dose of a substance or chemical that will (**LD₅₀**) kill 50 percent of the test animals in a group within the first 30 days following exposure.

LITER (L) - A measure of capacity. One quart equals .9 liters.

LOCAL EXHAUST VENTILATION - (Also known as exhaust ventilation.) A ventilation system that captures and removes the contaminants at the point where they are being produced before they escape into the workroom air. The system consists of hoods, ducts, a fan and possibly an air cleaning device. Advantages of local exhaust ventilation over general ventilation include: it removes the contaminant rather than dilutes it; it requires less air flow and thus is more economical over the long term; and the system can be used to conserve or reclaim valuable

materials. However, the system must be properly designed with the correctly shaped and placed hoods, and correctly sized fans and duct work.

LOWER EXPLOSIVE LIMIT (LEL) - (Also known as Lower Flammable Limit-or LFL). The lowest concentration of a substance that will produce a fire or flash when an ignition source (flame, spark, etc.) is present. It is expressed in percent of vapor or gas in the air by volume. Below the LEL or LFL, the air/contaminant mixture is theoretically too "lean" to burn. (See also UEL).

MELTING POINT - The temperature at which a solid changes to a liquid. A melting range may be given for mixtures.

MILLIGRAM (mg) - A unit of weight in the metric system. One thousand milligrams equal one gram.

MILLIGRAMS PER CUBIC METER - Units used to measure air (mg/m^3) concentrations of dusts, gases, mists, and fumes.

MILLIGRAMS PER KILOGRAM - This indicates the dose of a substance (mg/kg) given to test animals in toxicity studies. For example, a dose may be 2 milligrams (of substance) per kilogram of body weight (of the experimental animal).

MILLILITER (ml) - A metric unit used to measure capacity. One milliliter equals one cubic centimeter. One thousand milliliters equal one liter.

MSHA - The Mine Safety and Health Administration; a federal agency that regulates the mining industry in the safety and health area.

MUTAGEN - Anything that can cause a change (or mutation) in the genetic material of a living cell.

NARCOSIS - Stupor or unconsciousness caused by exposure to a chemical.

NFPA - The National Fire Protection Association is a voluntary membership organization whose aims are to promote and improve fire protection and prevention. NFPA has published 16 volumes of codes known as the National Fire Codes. Within these codes is Standard No. 704, Identification of the Fire Hazards of Materials. This is a system that rates the hazard of a material during a fire. These hazards are divided into health, flammability, and reactivity hazards and appear in a well-known diamond system using from zero through four to indicate severity of the hazard. Zero indicates no special hazard and four indicates severe hazard.

NIOSH - The National Institute of Occupational Safety and Health is a federal agency that among its various responsibilities trains occupational health and safety professionals, conducts research on health and safety concerns, and tests and certifies respirators for workplace use.

OEHS - Office of Environmental Health and Safety.

ODOR THRESHOLD - The minimum concentration of a substance at which a majority of test subjects can detect and identify the substance's characteristic odor.

ORAL - Having to do with the mouth.

OSHA - The Occupational Safety and Health Administration - a federal agency under the Department of Labor that publishes and enforces safety and health regulations for most businesses and industries in the United States.

OXIDATION - The process of combining oxygen with some other substance to a chemical change in which an atom loses electrons.

OXIDIZER - Is a substance that gives up oxygen easily to stimulate combustion of organic material.

OXYGEN DEFICIENCY - An atmosphere having less than the normal percentage of oxygen found in normal air. Normal air contains 21% oxygen at sea level.

PERMISSIBLE EXPOSURE LIMIT (PEL) - An exposure limit that is published and enforced by OSHA as a legal standard. PEL may be either a time-weighted-average (TWA) exposure limit (8 hour), a 15-minute short term exposure limit (STEL), or a ceiling (C). The PEL's are found in Tables Z-1, Z-2, or Z-3 of OSHA regulations 1910.1000. (See also TLV).

PERSONAL PROTECTIVE EQUIPMENT - Any devices or clothing worn by the worker to protect against hazards in the environment. Examples are respirators, gloves, and chemical splash goggles.

POLYMERIZATION- A chemical reaction in which two or more small molecules combine to form larger molecules that contain repeating structural units of the original molecules. A hazardous polymerization is the above reaction with an uncontrolled release of energy.

ppm - Parts (of vapor or gas) per million (parts of air) by volume.

REACTIVITY - A substance's susceptibility to undergoing a chemical reaction or change that may result in dangerous side effects, such as explosions, burning, and corrosive or toxic emissions. The conditions that cause the reaction, such as heat, other chemicals, and dropping, will usually be specified as "Conditions to Avoid" when a chemical's reactivity is discussed on a SDS.

RESPIRATOR - A device which is designed to protect the wearer from inhaling harmful contaminants.

RESPIRATORY HAZARD - A particular concentration of an airborne contaminant that, when it enters the body by way of the respiratory system or by being breathed into the lungs, results in some bodily function impairment.

SENSITIZER - A substance that may cause no reaction in a person during initial exposures, but afterwards, further exposures will cause an allergic response to the substance.

SHORT TERM EXPOSURE LIMIT - Represented as **STEL** or **TLV-STEL**, this is the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures. Also the daily TLV-TWA must not be exceeded.

"SKIN" - This designation sometimes appears alongside a TLV or PEL. It refers to the possibility of absorption of the particular chemical through the skin and eyes. Thus, protection of large surface areas of skin should be considered to prevent skin absorption so that the TLV is not invalidated.

SUBSTANCE - Any chemical entity.

SYNONYM - Another name by which the same chemical may be known.

SYSTEMIC - Spread throughout the body; affecting many or all body systems or organs; not localized in one spot or area.

TERATOGEN - An agent or substance that may cause physical defects in the developing embryo or fetus when a pregnant female is exposed to that substance.

THRESHOLD LIMIT VALUE (TLV) - Airborne concentrations of substances devised by the ACGIH that represent conditions under which it is believed that nearly all workers may be exposed day after day with no adverse effect. TLV's are advisory exposure guidelines, not legal standards, that are based on evidence from industrial experience, animal studies, or human studies when they exist. There are three different types of TLV's: Time Weighted Average (TLV-TWA), Short Term Exposure Limit (TLV-STEL) and Ceiling (TLV-C). (See also PEL.)

TIME WEIGHTED AVERAGE (TWA) - The average time, over a given work period (e.g. 8-hour work day), of a person's exposure to a chemical or an agent. The average is determined by sampling for the contaminant throughout the time period. Represented as TLV-TWA.

TOXICITY - The potential for a substance to exert a harmful effect on humans or animals and a description of the effect and the conditions or concentrations under which the effect takes place.

TRADE NAME - The commercial name or trademark by which a chemical is known. One chemical may have a variety of trade names depending on the manufacturers or distributors involved.

UNSTABLE LIQUID - A liquid that, in its pure state or as commercially produced, will react vigorously in some hazardous way under shock conditions (i.e., dropping), certain temperatures, or pressures.

UPPER EXPLOSIVE LIMIT (UEL) - Also known as Upper Flammable Limit (UFL). Is the highest concentration (expressed in percent of vapor or gas in the air by volume) of a substance that will burn or explode when an ignition source is present. Theoretically above this limit the mixture is said to be too "rich" to support combustion. The difference between the LEL and the UEL constitutes the flammable range or explosive range of a substance. That is, if the LEL is 1ppm and the UEL is 5ppm, then the explosive range of the chemical is 1ppm to 5ppm. (see also LEL).

VAPOR - The gaseous form of substances which are normally in the liquid or solid state (at normal room temperature and pressure). Vapors evaporate into the air from liquids such as solvents. Solvents with low boiling points will evaporate.

Appendix B: Incompatible Chemicals

Certain hazardous chemicals should not be mixed or stored with other chemicals because a severe reaction can take place or an extremely toxic reaction product can result. The label and SDS will contain information on incompatibilities. The following table contains examples of incompatible chemicals:

CHEMICAL	KEEP OUT OF CONTACT WITH
Acetic Acid	Chromic acid, nitric acid hydroxyl compounds, ethylene, glycol, perchloric acid, peroxides, permanganates

Acetone	Concentrated nitric and sulfuric acid mixtures
Acetylene	Chlorine, bromine, copper, fluorine, silver, mercury
Alkali Metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, the halogens
Ammonia, anhydrous	Mercury, chlorine, calcium hypochlorite, iodine, bromine, hydrofluoric acid
Ammonium Nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenical materials	Any reducing agent
Azides	Acids
Bromine	Same as chlorine
Calcium Oxide	Water
Carbon (activated)	Calcium hypochlorite, all oxidizing agents.
Carbon tetrachloride	Sodium
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials
Chromic Acid	Acetic acid, naphthalene, camphor, glycerin, turpentine, alcohol, flammable liquids in general
Chlorine	Ammonia, acetylene, butadiene, butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine Dioxide	Ammonia, methane, phosphine, hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene Hydroperoxide	Acids, organic or inorganic
Cyanides	Acids
Flammable Liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic Acid	Nitric acid, alkali

Hydrofluoric Acid	Ammonia, aqueous or anhydrous
Hydrogen Peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, flammable liquids, oxidizing gases
CHEMICAL	KEEP OUT OF CONTACT WITH
Hydrogen Sulfide	Fuming nitric acid, oxidizing gases, acetylene, ammonia (aqueous or anhydrous), hydrogen
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous or anhydrous), hydrogen
Mercury	Acetylene, fulminic acid, ammonia
Nitrates	Sulfuric acid
Nitric Acid (concentrated)	Acetic acid, aniline, chromic acid, hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines
Oxalic Acid	Silver, mercury
Oxygen	Oils, grease, hydrogen; flammable liquids, solids, or gases
Perchloric Acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood
Peroxides, organic	Acids (organic or mineral), avoid friction, store cold
Phosphorus (white)	Air, oxygen, alkalies, reducing agents
Potassium	Carbon tetrachloride, carbon dioxide, water
Potassium Chlorate	Sulfuric and other acids
Potassium Permanganate	Glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaric acid, ammonium compounds
Sodium	Carbon tetrachloride, carbon dioxide, water
Sodium nitrite	Ammonium nitrate and other ammonium salts

Sodium Peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)
Tellurides	Reducing agents